# EDISON ELECTRIC INSTITUTE BULLETIN

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EDISON ELECTRIC INSTITUTE

# STATISTICAL DATA OF THE ELECTRIC LIGHT AND POWER INDUSTRY

*Compiled Monthly by the Edison Electric Institute—Covers 100% of the Industry*

## DURING THE MONTH OF JULY

| | 1938 | 1937 | % |
|---|---|---|---|
| | **SOURCE OF ENERGY** | | |
| **Kilowatthours Generated (Net)** | | | |
| By Fuel Burning Plants | 5,651,701,000 | 6,736,703,000 | −16.1 |
| By Water Power | 3,385,648,000 | 3,150,601,000 | + 7.5 |
| Total Generation | 9,037,349,000 | 9,887,304,000 | − 8.6 |
| **Net Purchases** | | | |
| From Other Sources | 310,419,000 | 261,887,000 | +18.5 |
| Net International Imports | 93,979,000 | 111,803,000 | −15.9 |
| Total Purchased Power (Net) | 404,398,000 | 373,690,000 | + 8.2 |
| **Total Input** | **9,441,747,000** | **10,260,994,000** | **− 8.0** |
| | **DISPOSAL OF ENERGY** | | |
| **Total Sales** | **7,562,210,000** | **8,356,727,000** | (a) |
| **Energy Not Reported as Sold** | | | |
| Used in Electric Railway Department | 28,015,000 | 45,166,000 | (a) |
| Used in Electric and Other Departments | 149,551,000 | 141,745,000 | (a) |
| Furnished Free or Exchanged in Kind | 1,697,000 | (Not Shown) | (a) |
| Total Not Reported as Sold | 179,263,000 | 186,911,000 | (a) |
| **Total Energy Accounted For** | **7,741,473,000** | **8,543,638,000** | **− 9.4** |
| Losses and Energy Unaccounted For | 1,700,274,000 | 1,717,356,000 | − 1.0 |
| **Total Output** (To Check Above **"Input"**) | **9,441,747,000** | **10,260,994,000** | **− 8.0** |

## CLASSIFICATION OF KILOWATTHOUR SALES

| **Based on FPC Classification—July 1938** | | **Based on EEI Classification—July 1937** | |
|---|---|---|---|
| Residential or Domestic | 1,501,651,000 | Domestic | 1,367,542,000 |
| Rural | (Allocated to Other Classes) | Commercial—Small Light and Power | 1,440,526,000 |
| Commercial and Industrial | 5,295,923,000 | Commercial—Large Light and Power | 4,871,868,000 |
| Public Street and Highway Lighting | 129,590,000 | Municipal Street Lighting | 157,262,000 |
| Other Public Authorities | 189,135,000 | Street and Interurban Railways | 336,474,000 |
| Sales to Railroads and Railways | 410,018,000 | Electric Steam Railroads | 100,284,000 |
| Interdepartmental | 31,802,000 | Municipal and Miscellaneous | 82,771,000 |
| Other Sales | 4,091,000 | | |
| Total Sales | 7,562,210,000 | Sales to Ultimate Customers | 8,356,727,000 |

## CLASSIFICATION OF CUSTOMERS

| **Based on FPC Classification—July 31, 1938** | | **Based on EEI Classification—July 31, 1937** | |
|---|---|---|---|
| Residential or Domestic | 22,823,366 | Domestic | 22,090,401 |
| Rural | (Allocated to Other Classes) | Commercial—Small Light and Power | 3,845,280 |
| Commercial and Industrial | 4,558,028 | Commercial—Large Light and Power | 562,803 |
| Public Street and Highway Lighting | 26,065 | Municipal Street Lighting | 33,889 |
| Other Public Authorities | 72,442 | Street and Interurban Railways | 330 |
| Railroads and Railways | 280 | Electric Steam Railroads | 26 |
| Interdepartmental | 308 | Municipal and Miscellaneous | 35,481 |
| Others | 3,606 | | |
| Total Customers | 27,484,095 | Total Ultimate Customers | 26,568,210 |

## REVENUE (b)

| **Based on FPC Classification—July 1938** | | **Based on EEI Classification—July 1937** | |
|---|---|---|---|
| Revenue from Sales Excluding Sales to Other Public Utilities | $173,984,700 | Revenue from Ultimate Customers | $177,859,100 |
| Other Revenue | 2,114,600 | | |
| Total Revenue | $176,099,300 | | |

## ESTIMATED DOMESTIC ELECTRIC SERVICE RATIOS

(For the 12 Months Ended July 31st)

| | 1938 | 1937 | % |
|---|---|---|---|
| Kilowatthours per Customer | 832 | 772 | + 7.8 |
| Average Annual Bill | $35.68 | $34.75 | + 2.7 |
| Revenue per Kwhr | 4.29¢ | 4.50¢ | − 4.7 |

(a) Data for two years not strictly comparable.
(b) Data not comparable because of an unascertainable amount of "Revenue in July 1938 which may or may not have been included in the 1937 data.

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EDISON ELECTRIC INSTITUTE BULLETIN

Volume 6 OCTOBER, 1938 No. 10

# The Public Utility Man's Job

*The text of a leaflet issued by the Central Hudson Gas & Electric Corporation a few days after the disastrous hurricane of September 21*

ON Wednesday, Sept. 21, the outer edge of a hurricane of unprecedented violence which devastated hundreds of miles of river valley and seacoast and brought tragedy to thousands of homes in the northeastern section of the Atlantic Coast, passed over the Central Hudson Valley leaving in its wake the most severe damage to property and essential services ever experienced in this area. Notification was received at 4 p. m. from the Weather Bureau at Albany that the storm was approaching New York City but that it was impossible to forecast whether it would pass up the Hudson or Connecticut Valley. The field forces of the company were immediately mobilized and every effort was made to prepare for the emergency. High pressure gas holders were filled and the large low pressure holders were deflated to lower their wind resistance. Emergency crews were called into service and all important offices manned with extra personnel. At 5 p. m. the effects of the storm were first felt and a second call to the Weather Bureau indicated that the center of the storm was at Floyd Bennett Field on Long Island. The storm reached its peak at 5.30 p. m. with wind velocities approaching 70 miles per hour and did not abate until about 8.30 p. m. During the four preceding days over 9 inches of rain had fallen in the Central Hudson Valley so that the area was faced with extreme conditions of both wind and flood. It subsequently developed that the hurricane moved up the Connecticut River Valley so that the death and destruction experienced in the New England States was far greater than that in the Hudson Valley. A survey of the effects of the storm, however, indicated that it reached great violence on the east side of the river and in the southern end of the Company's territory. The cities of Newburgh, Beacon and Poughkeepsie and the outlying sections of Dutchess County felt its full force. On the west side of the river Kingston and certain isolated sections were affected, particularly those at exposed points on high ground.

Aside from the reported casualties and injuries and the widespread damage to property of all classes, the storm wrought havoc with the transportation, electric service and communication facilities of the area. The generating and high tension transmission facilities of the Company were practically unharmed but the damage to its distribution lines from falling trees and washouts was greater than ever before experienced. The extensive interruption of electric service brought thousands of calls for relief. At Poughkeepsie the incoming calls so completely tied up the ten trunk lines entering the Company's switchboard that five men were sent to the office of the telephone company to receive calls and so relieve some of the Company's trunk lines for the necessary outgoing calls to its field forces. At 7 p. m. it was estimated that 35,000 to 40,000 customers or 50 per cent of the total, were without service and that a large portion of the street lighting service was lost. The Company faced the stupendous task of restoring more than half of its service under the handicaps of disrupted transportation, restricted communication and dangerous working conditions. Many sections of the territory were completely isolated so that contact with the working forces was impossible. In this extreme situation the Company tackled first the job of safeguarding life and property, using every resource to remove fallen poles, wires, etc. Next, it restored essential services to hospitals, pumping stations, sewage disposal plants, telephone companies, railroad signal stations, etc. Its entire working force, augmented by all employees who could be used in any capacity, then undertook the job of reestablishing service generally throughout the entire area. These forces worked during Wednesday night with practically no sleep and little food. By Thursday morning all main circuits in the cities were back in operation. At that time the full extent of the disaster could be more readily determined and every available lineman in the territory was hired together with a large number of additional laborers. A large force of engineers, estimators, meter men, meter readers and others was organized to patrol every line owned by the Company. At 3 p. m. on Thursday, the Wappingers Falls 1000 kilowatt substation was washed away. A new substation was constructed and new transformers hauled to the site so that service was restored within 10 hours. All forces worked until midnight on Thursday when rest became essential and skeleton crews only were maintained during the balance of the night. On Friday morning at 7 a. m. the number of customers out of service had been reduced to 6600 or only 9 per cent of the total. The work continued day and night

throughout Friday, Saturday and Sunday until at 6 p. m. on Sunday it was reported that service had been restored to all customers.

During this emergency the Company had over 500 men in the field working under the most adverse conditions ever encountered. They answered every call made upon them at great personal risk and reported only five minor injuries. Only two injuries to the public, involving the Company's facilities, were reported—neither of major importance. During the worst of the storm the load on the Company's system dropped to about 60 per cent of normal. The Poughkeepsie steam station, usually held as stand-by, ran throughout the emergency to relieve the state-wide transmission system to whatever extent possible. The lack of communication during the period of reconstruction demonstrated the need for short wave radio communication for the control of the field forces and arrangements are being made for the installation of such equipment. The extraordinary expense resulting from this unfortunate experience will amount to approximately $35,000 and will be provided from the Company's contingency reserve which amounts to approximately $220,000.

The Company's forces did their job without complaint and with the highest spirit of service. They performed deeds of mercy and of charity in addition to the service upon which they were engaged. No obstacle was insurmountable; no responsibility too great to assume. It is a privilege and an honor to be associated with these men. On behalf of the management, directors and stockholders of the Company, I wish to express the deepest appreciation for the ability, courage and resourcefulness with which they have met this emergency. As an added tribute to our own personnel and to all those who have helped to meet the crisis in other stricken areas, we reproduce herewith, with our highest compliments, the editorial which appeared in te New York *Times* of Friday, Sept. 23, 1938.

ERNEST R. ACKER,
*President.*

*(An Editorial Reprinted from the New York Times of Friday, Sept. 23, 1938)*

## "THE SONS OF MARTHA

"The big wind and rain came out of the South without any previous ultimatum. It hit us hard, and our neighbors to the east and northeast harder. Some it killed and some it wounded, for we had no air force with which to repel the attack. It washed out or blew down our houses, gouged our roads, knocked down our trees, and with them our power and telephone lines, paralyzed our railroads. When the electricity went off in thousands of homes the lights, the cook stove, the refrigerator, the radio and even the heating plant went out of commission, too. The candles flickered romantically in many homes and some housewives found it a lark to cook over the open flame of a fireplace. But two days of this would have brought widespread disaster, a week would have been a calamity, a month an appalling tragedy.

"It was then that the Sons of Martha put on their boots and sou'westers and went out into the gathering darkness. From Boston to Atlantic City, on surf-beaten shores and along inland rivers, they found their work waiting. They were linemen, section men, trainmen, road gangs, Coast Guards, policemen, firemen. There was hardship to be endured and they endured it. There were risks to be taken and they took them. One saw their red lanterns waving in the night, the rain running off their slickers. They climbed and chopped, waded, swam and paddled. They did delicate and dangerous things in order that we might not miss our morning coffee or our morning trains. They rescued hurt and frightened people and they brought in the bodies of the dead. What the circumstances demanded of them they did, in darkness, without banners, and not for medals. They earned some overtime pay and in many cases will doubtless receive it. But that was not what they worked for.

"Kipling wrote of them, long ago:

> "It is their care in all the ages to take the buffet and cushion the shock.
> It is their care that the gear engages; it is their care that the switches lock . . .
> They finger death at their gloves' end where they piece and repiece the living wires . . .
> Not as a ladder from earth to heaven, not as a witness to any creed,
> But simple service simply given to their own kind in their common need.

"Kipling knew what to look for when events like this happen, that almost crowd an international crisis off the front pages. When the Ganges or the Mississippi is in flood, when lines go down in Kansas or in Bavaria, when the drowned rails must be restored in Arkansas or Italy, the Sons of Martha do as brave a job as soldiers ever did. And we can match our men in slickers, job for job, risk for risk, devotion for devotion, against any in the world, in a contest in which man does not draw his brother's blood."

## Discovery Month Promotes Sales

THE Discovery Month campaign, promoted nationally during October by The Modern Kitchen Bureau to promote the sale of electric ranges and water heaters, has gained excellent acceptance. As the BULLETIN goes to press, reports from participating utilities on the number of units sold are being received daily, and good progress is being made toward quotas. National quota for ranges during the month is 30,000; for water heaters, 8,000.

The general theme of the campaign is "ELECTRICITY IS CHEAP." The Range Campaign adds: "See for yourself that ELECTRIC COOKING costs ONE-HALF what you think." For the Water Heater Campaign the further slogan is: "What One Million Users of Electric Water Heaters Have Discovered!"

It should be emphasized that these two campaign themes, while planned for use in October, are perfectly good for continued use throughout the year. Utilities can thus make profitable use of this theme month after month by encouraging their dealers to use local figures based on local rates and actual power bills of customers *to convince prospects that the figures actually apply to them.* The "Star Salesman's Recipe for Cooking Up Electric Range Sales," published by the Bureau, explains how this is done.

The electric range theme is based on two national surveys made by electric range manufacturer members of the Bureau. The first covered 1,000 owners of electric refrigerators who did not, at the time of the survey, own an electric range. These women were asked to estimate how much it would cost them to operate an electric range if they had one. Their answers ran from $5 to $35 a month. The average of all was $10.

In contrast to this, the second survey covered 1,284 electric range owners in 19 cities in the north, east, south and west. They were asked: "What do you think your cooking costs were for last month? Replies from these women gave an average figure of $2.30 a month, and 80 per cent of the women set the figure under $3.00.

# What the Engineering and Operating Side of the Utility Business Offers for the Future

By J. L. Hecht

*Vice-President, Public Service Company of Northern Illinois*

An address before the Illinois Public Utilities Association, Springfield, Ill.

I WAS TOLD that this convention would be attended by a considerable number of the younger men, and I was asked to give my views on opportunities of today for the young men in the utility business, and while the title assigned to my talk appears to be restricted to the engineering or operating side of the utility business, much of what I shall say applies equally to all phases of the business.

May I say, to begin with, that the opportunity for advancement in the utility business today does not appear to me to be materially different from what it was when I first went to work for a utility company 37 years ago this summer. I clearly remember a discussion among a group of the younger men where some of them deplored what they thought to be the fact that they would not have the opportunity that those who started twenty years earlier had, whereas the utility business had hardly started to develop.

Let me enumerate some of the problems which I see before us and opportunities which they present. Every period of general business stagnation, such as has existed to a greater or less extent during the past five or six years, is certain to be followed by a period of active development. There is, at this time, a considerable back-log of construction to be carried out by utility companies which calls for ingenuity to meet the future requirements. Following are some of the more salient conditions which will require ingenuity, new thoughts and changes from existing methods and standards. The more universal uses of utility service for domestic, business and industrial purposes indicate the need of ever-improving service and reliability. For example, I recall the time when we did not feel concerned about having only a single source of supply to a group of residential customers. It was practical to take a line out of service during the day, with the possible exceptions of Monday mornings, when washing was being done, and Tuesday, when ironing was being done. But with the greatly increased use of all manner of devices, in the course of time it became necessary to give practically continuous service and provide the necessary facilities for doing it. The best method we have found to date for accomplishing this has been the obvious one—providing duplicate facilities. It naturally follows that this involves large capital expenditures, and the engineers who can design equipment and devise methods of operation which will enable us to improve service continuity without the cost of duplicate facilities will be performing a very valuable service to the industry.

The constantly mounting taxes and expenses make it necessary to have an exact knowledge of all operations so as to be able to devise ways and means of developing more efficient methods in all divisions of the business. I have in mind, for example, that over a period of years production methods and economies have been perfected to a remarkable degree, whereas, the same skill must be applied to all other branches of the utility business as has been applied to the design, construction and operation of the generating station. Month by month, there was before the executives a measure of the results in both B.T.U. and switchboard cost per kwhr. The fact that such a measure of results in transmission, distribution, accounting and many other phases of the business was not constantly before the eyes of the executives has in large measure resulted in the failure to create the stimulus necessary for the highest ability to be applied to these other utility problems.

The increasing relative size of fixed costs as compared to operating costs suggests the need of bringing about a reduction in investment per unit of capacity or output so as to improve the rate of capital turnover and place the utility in a position where it can reach the more marginal types of business and sell incremental energy at a price sufficiently low to interest the users.

During the past few decades we have seen a phenomenal growth in the use of the service which we are selling. New, unforeseen uses have sprung into being almost over-night as, for example, general use of air conditioning, the very much greater standard of lighting, etc. All of this brings to mind the need and the justification for more thorough general planning and places on engineering authority a greater responsibility. As mentioned, we have seen a phenomenal growth in lighting, but I would venture to predict that, even for lighting, the use of electricity is small by comparison with what we may expect in the future. The use of air conditioning in the home can be said to have hardly started.

There are any number of problems to be met, and it should be borne in mind that those mentioned here are merely used as examples and not meant to exhaust the subject. While I mentioned the real progress made in improving efficiency of electric generation, it is only necessary to remind ourselves of the fact (which we all know but often overlook) that we lose about two-thirds of the heat content of our fuel in converting coal to kilowatt hours to see that there is still a definite field for engineering talent in the production department.

Another field for study is the matter of energy losses. With between 15 per cent and 20 per cent of the kilowatt hours generated in most systems failing to reach the customers' meters, there are appreciable savings to be made by the engineers who can reduce these losses.

Likewise, the gas utility offers a large field for engineering study. Here again the problem of reliability of service is of major importance. Development of an economical, low investment cost source of substitute gas for use in the event of in-

terruption to the normal supply would be of great benefit. Increased demand for gas for space heating purposes, at a relatively low load factor, emphasizes the need for means of supplying additional peak load gas without too great an increase in plant investment. I think it is probable that many of the younger men today feel that the gas industry does not offer a field for engineering talent, due to the relative age of the business, but I wish to emphasize that there is considerable room for active engineering work in the gas utility.

The summation of all of the above conditions makes it evident that we may expect to see a gradual transition in the designing and building of systems, carrying with it a large amount of revamping of existing systems so as to make provision for future uses of the service not now even contemplated. More attention must be given in planning of systems to reduce the factor of obsolescence so as to compensate for, and in the future reduce, the very heavy charges against operation which must be made to take care of depreciation. In fact, in past years when I have had occasion to make analyses of utility operating companies, I have frequently found that the depreciation requirements were a principal determining factor in the question of whether or not they were earning a fair return. It should be borne in mind that anything we can do to retard obsolescence by improved engineering design and thus reduce the annual depreciation requirements reflects directly in the net earnings of the business.

While from the very start, the matter of financing was of prime importance, the early developments in the utility business were in a large measure dependent upon engineers. Later on, as development proceeded at a rapid pace, the business became more generally dependent upon financial considerations. However, I feel that, going back some 14 or 15 years, there was a noticeable trend toward a more wholesome recognition of the need of operating and engineering knowledge and experience in many major executive positions, and this trend has become increasingly pronounced. There are, of course, many reasons for this, and while the top control generally is, and is likely always to be, financial, many problems, such as reduced profit margins (both through regulation and competition) and goals of sales effort which must be guided to fit operating possibilities and requirements, tend toward engineering and operating executive management. The larger industrial-customer units require engineering understanding of their problems and requirements in order that suitable relations be maintained. It is part of the job of the engineering and operating executives to guide and advise in other functions, such as the application of accounting methods, rate making, the intelligent interpretation of the results of operations and even the financing requirements based on engineering and operating results. The importance of engineering and operating ability in the above fields has become clearly recognized, and it is my personal opinion that because of the size and financial importance of the problems, the opportunities of the younger technical men (and I use the term "technical" broadly, to include not only those who have primarily engineering education, but the large number who obtain a broad liberal education coupled with some engineering courses) will be limited only by ability, effort of the individual and the extent to which he may be willing to make sacrifices in order to succeed.

While what I have just said seems to emphasize the managerial side of the business, I do not want you to overlook the opportunities and standing of the professional engineer in design and operating work. The various problems I have touched on, which are only a few of those which will undoubtedly be facing us, indicate that the more technical phases of the business are of great importance, and can not be overshadowed by the more publicized phases such as selling, legal, etc.

I realize that considerable of what I am saying puts me in the position of giving advice, therefore probably subjecting myself to criticism, for, if I may quote from Shakespeare, "I can easier teach twenty what were good to be done, than be one of the twenty to follow mine own teaching." In fact, as I have had occasion to present papers in the past, I have always confined myself to factual data, and this is my first venture afield. I hope it will not be taken as a sign of conceit, but in the spirit intended: that of wishing to use such experience as I have had in the interest of helping younger men.

I feel that the surest way to get on is to set a definite objective and let nothing interfere with reaching it. I recall, as a small boy in the fourth grade in school, hearing my teacher in the drawing class say, "If you wish to draw a straight line between two points, do not let your eye follow the pencil as it progressses from the first to the second point, but set your eye on the second point, and with a little practice, it will be found that a straight line between them will always result." The scheme appealed to me at the time and stuck in my mind, but I did not realize then that this fourth-grade teacher had made known to me, at the outset, the secret of success. Pick your objective, set your eyes upon it and you will arrive there, provided that objective is within the limits of your ability.

I would caution you against the setting of the objective so high as to bring continual discouragement. We must recognize the fact that no army can be composed wholly of captains, although maybe there are more captains' jobs available in the utility business today and likely to be in the future, than there are men available with the ability to attain the rank. After all, one should determine to what extent he is willing to make sacrifices and submit to circumstances with which he is apt to be confronted and set his objective accordingly, perhaps not hesitating to readjust and change his objective from time to time, as developments and experience may justify so doing. I consider it important to carefully weigh every situation before determining a method of procedure, but once the job is undertaken, never stop until it is finished and be sure that every step is covered thoroughly. Do not be discouraged by periods of time in which there may be no apparent progress, or periods during which there may appear to be injustices toward you. Time is a wonderful corrector of all wrong conditions. In fact, in my experience, I have never known a failure of the prinicple that, if an individual will be patient, time will correct any wrong condition. Forget about yourself and devote your thought and energy to your work, don't worry about lack of recognition—good work is noticed whether one realizes it or not.

Develop self-reliance and the ability to make your own decisions. This is best accomplished by carrying through to a conclusion jobs that are given you. Don't fall into the error of consulting your superior unnecessarily, it develops the habit of dependence on others for decisions.

I would like to raise a caution against over-close devotion to the particular work before you. There is a tendency, particularly among engineers, to neglect the broadening of their horizons. Learn everything possible about other busi-

nesses as well as your own. Everything learned is likely to be of value at one time or another. Meet people in all walks of life and try to see things through their eyes as this will teach you to be more tolerant of the views of others. Technical training in itself tends to make one very positive that a thing either is or is not, whereas, when dealing with the views of other people, it becomes necessary to assume that maybe some modifications of one's own views can be justified and are advisable.

Of equal importance with the setting of an objective is the matter of selecting a type of work which you wish to do. When you consider that, if you would succeed, most of your waking hours will be spent at your work, the chances of successfully carrying on such work are greater if you have selected work which is congenial. Of course, it is necessary to be willing to do work, from time to time, which may be drudgery.

Vital among the requisites for success is the maintenance of one's personal health, so as to be able to meet all demands of work. I speak particularly of the strenuous, continuous work often required in utility operation, for we are in a business which must go on 24 hours a day and 365 days in the year.

Closely coupled with the matter of personal health is the matter of mental health. If you would succeed in operating work in a utility company, train yourself not to worry, to foresee all eventualities possible and defend against them and, after this is done, forget them. It is essential to develop the quality of being able to put your work out of your mind at will and relax. Some years ago I saw in an engineers' club, a large picture of an old patriarch with a flowing white beard. Inscribed on the picture were the words: "I lived to be 100 years old. My life was full of troubles—ninety per cent of which never occurred." The thought came to me that if I would not worry about the ninety per cent which never occur, I would store up so much energy that there would be no difficulty in taking care of the ten per cent when they did arrive.

I do not believe that any young man can expect to succeed if he does not have a proper respect for his superiors in authority. If you cannot respect the person for whom you are working you are unwise to continue your employment. If you do not respect your superiors you belittle yourself by being willing to be their subordinate. I have always found

(*Continued on page 440*)

# Sales Committee Is Directed Towards Best Utilization of Existing Facilities

**By H. E. Dexter**

*Chairman, General Sales Committee, E. E. I.*

THE Principal Program of the General Sales Committee of the Edison Electric Institute for 1938 will be directed toward the sale of electricity in the markets which will make the best utilization of existing facilities.

In general, this will mean, as far as the residential customers are concerned, the sale of electricity consuming devices with connected loads of less than 1500 watts, and devices that will give enough customer satisfaction to prevent their being put away on the shelf and forgotten after the newness has worn off.

To be more specific, there are in our city and rural areas thousands of nonprofitable, low use customers. Many of these customers are very poor, with no money for anything except a rather meager existence, but they all eat, and some of the food at least is cooked at home; they all use a little hot water occasionally, if not daily, and occasionally they have a small amount of food that requires preservation from one meal to the next; and they all use some light.

It is a part of the Sales Committee program to find the solution whereby these services can be performed by electricity. There is equipment on the market that will perform all of these operations satisfactorily for the customer and without requiring additional capacity on the part of the utility. Generally speaking, the efficiency of this equipment is so superior to that now used by this class of customer that the rates for electric service now available will permit the customer to use this equipment in place of the fuel he is now using, if he is properly instructed.

The principal hurdle is how to get the equipment into use; how to extend the use of electricity in these poor homes so that they too may have complete electric kitchens, although not necessarily using the present conventional cooking and water heating equipment.

That it can be done, I am certain from the first-hand experiments that have been carried out. All it requires is to redirect our genius, our efforts and our thinking along the proper channels. We have had our eyes too long upon the annual increase in kwhr as a measure of the success of our sales plans. That isn't the important item, and neither is the annual increase in Estimated Annual Gross Revenue—it is the effect on the operating NET revenue of the company that is the true measure of our sales success.

The kilowatt hours which are added by the sale of complete electric kitchens using devices with connected loads of 1500 watts or less, and by the sale of good lighting, brings revenues of from 3½ to 5 cents per kwhr in most cases. These kilowatt hours help turn unprofitable customers into profitable ones, and at the same time render an excellent service to the customer at an operating cost that is competitive with his present methods.

In addition to the work planned for the development of the low income residential customer, particular attention will be given to the development of the farm market. Here our companies have expended many millions of dollars to make service available, and it is now our task to make these lines profitable. The Electric Water Systems Council, which has been so effective, will be continued, and an attempt will be made to work out a cooperative program with several manufacturers of electrical farm equipment, looking to a more organized development of our rural market and to increasing the rate of sales in this very important field. Few of us fully realize the value of electric service to the farmer and the revenue possibilities for the utilities in this field; not only present possibilities in the production of farm products, but the future possibilities in carrying more nearly to completion, right on the farm, the processing and finishing of these products.

The work in the power and commercial field, so admirably carried out in past years, will be continued, and although it is our intention to drive hard on the bread and butter items, we do not intend to lose sight of the creative sales programs like Kitchen Modernization, Better Light-Better Sight, and Adequate Wiring. These programs are very valuable, continually pointing the way to the best things electrically, and without them our industry would eventually stagnate.

*Lindemann Prize Paper*

# "Is Electric Cookery Really Better?"

**By George E. Kelley**

NOT LONG AGO in one of our western cities, a $300.00 electric range was given away as a prize for the best angel food cake entered in a contest which was conducted in connection with one of the old-time electric cooking schools.

That was won by a kindly old lady who lived alone in a small house in a poorer section of the city. The cake was baked in the oven of an old decrepit wood range worth, perhaps, $5.00. Yet, the cake was as fine a one as any judge ever examined. An electric oven could not have done better.

The little old lady was beside herself with joy when she learned she had won the prize and she rushed up to a representative of the electric power company and said,

"I'm so happy I won that electric range; but, say, that's embarrassing to you electric people to have to know that I baked that cake in a wood range."

The power company man smiled and said, "Lady, I'm sure we are all glad that the range was won by someone who doesn't already have a good electric range of her own, and we never have claimed that a good cook couldn't do well with other kinds of fuel than electricity, but we do think that electricity will help to make more 'good' cooks."

And this is what the little lady answered, "I have used an electric range too, and have baked the same kind of cake in an electric oven and I'll tell you the difference. The result would be practically the same; the cake out of the electric oven might stay fresh longer than if it came out of any other kind of oven, I've heard bakers say so, but I don't know about that. Anyway, they look the same to me, and here is the difference as I see it:

"During the hour my cake was in the oven of that wood stove, I never left the kitchen. I watched over that fire like a cat at a rat-hole. I had a box full of fine kindling I could use to keep that fire right where I wanted it and, you saw the result.

MR. KELLEY

*Mr. Kelley is the winner of the Second Lindemann Award for 1938.*

*Mr. Kelley joined the sales force of the Portland General Electric Company in 1926 and for eight years actively sold electric ranges, refrigerators and water heaters as a territory salesman. He was then made sales supervisor and continued in that capacity until this year when a new department was formed to carry on a dealer promotion work and he was selected to assist in this new capacity.*

"Now here's how I'd bake it in my daughter's electric range: I'd mix the cake exactly the same, set the automatic temperature control, put the cake in about the middle of the oven, close the oven door, set the alarm for one hour later, then go ahead and do something else.

"There's the difference. If my time is worth anything at all, and I try to make it worth something, it certainly is worth too much to spend it watching any kind of oven which won't always give me certain results without that tiresome watching.

"And, speaking of watching, let me tell you what my daughter does with her range each Sunday. She fixes her Sunday dinner right after breakfast Sunday morning, puts it all in the oven, sets the clock, goes to church with her family and even goes for a ride after church with never a worry about dinner being ready when her hungry mob gets home and wants to *eat*.

"Here's another difference you may not know. My nephew runs a barbecue eating place over on the country road. He says he roasts his 'barbecue' meat in an electric oven because the meat doesn't shrink so much as by any other method; including other kinds of ovens, and he gets more slices to the pound and the meat is more tender and juicy. I thought you'd like to know that.

"Now I've told you all this, maybe you could answer a question for me. I can bake my angel food cake in a wood range and in an electric range, and get almost exactly the same results each time; but whenever I try my recipe at my niece's home, sometimes the cake comes out all right and sometimes not so good. The automatic control on the oven seems to work all right. I was just wondering if the chimney or the flue could make any difference. The oven is connected with a flue and I know with my wood range how pesky uncertain the chimney drafts can be so I'm wondering if that could make any difference."

To which the power company man answered, "Yes, it is possible and probable that *any* oven attached to a flue could be affected by changing weather conditions outside the home. That is liable to be the trouble at your niece's house. If that's an electric range, we would suggest that the flue be disconnected from the oven immediately.

"Oh! It's *not* an electric range! We'll just hope that some day your niece will have an electric range like your daughter has now and a fine, clean, all-white range like you will have this week. You can hurry her into buying an electric range if you will tell her what you have told me about time saving and food saving; and then add that electric cook-

(*Continued on page* 448)

# Radio Dispatching of Trouble Crews

By John W. Drummond

*The Detroit Edison Company*

A paper presented at a joint meeting of the Transmission and Distribution Committee and the Electrical Equipment Committee, E.E.I., Old Point Comfort, Va., Oct. 11, 1938

THE Federal Communications Commission on June 15, 1936, held an informal engineering hearing for a number of reasons, one of which was "for the purpose of determining the present and future need of the various classes of services for frequencies above 30,000 kc, with the view of ultimately allocating such frequencies to services."

In anticipation of this hearing, a number of interested members of the Electrical Equipment Committee and Transmission and Distribution Committee of the Edison Electric Institute had a discussion of the question at the Hotel Statler in Detroit following the regular meeting of May 12, 1936.

The Operating Committee of the Edison Electric Institute appointed Mr. H. W. Eales as chairman of a committee to handle the interests of the members of the E.E.I. This committee functioned very promptly with the result that an excellent presentation of the interest of public utilities in the various radio channels under consideration was given at the June 15 hearing. The path for action by the various public utilities was definitely laid out as a result of these activities. The Detroit Edison Company applied for a construction permit for a short wave transmitter to operate in the band from 30,000 kc to 42,000 kc. The installation was completed in early months of 1938 and the system was placed in commission March 29, 1938. The first emergency message was dispatched by radio on March 31, 1938.

When a considerable number of medium high frequency wave lengths were made available for emergency service in 1929, The Detroit Edison Company placed its established point to point radio stations on these frequencies according to the regulations governing the assignment of these medium high frequencies for Special Emergency. A few other companies also took advantage of these assignments. Many power companies failed to avail themselves of these frequency assignments and flood and other emergencies since then have shown the wisdom of those who did take advantage of this opportunity. There are so many other services seeking allocation of frequencies in the radio spectrum that those who do not avail themselves of assigned frequencies soon find the frequencies taken over by other interests.

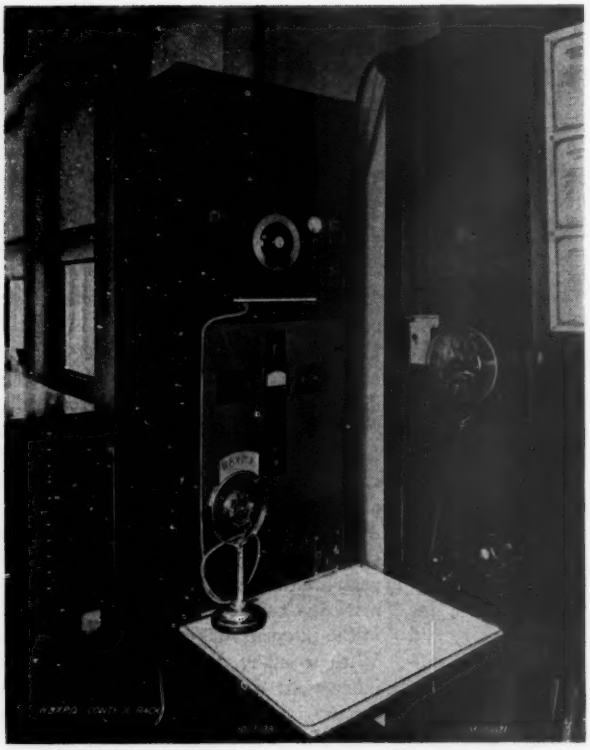
The Commission has recognized the requirements of the power industry and has earmarked 10 frequencies in the 30-42 mc. band for Special Emergency Service. I wish to point out that if there is any lack of interest on the part of the power companies, without a doubt we may expect a reduction in the number of channels assigned, as there is very strong competition from other services who will make immediate use of these frequencies. If the power companies desire to indicate to the Commission that their requirements as set forth in the E.E.I. testimony at the 1936 hearing were not exaggerated estimates, a substantial number must proceed at once by requesting construction permits and proceeding with installations of radio dispatching systems.

The ultra-high frequency emergency dispatching system used by The Detroit Edison Company is relatively simple. The control equipment is located at the dispatching center for the Detroit Division of the Overhead Lines Department which is known as the Line Board and which functions 24 hr. per day. Leased telephone wires connect the equipment at the Line Board with the transmitter at Fenkell Warehouse, about six miles away. The transmitter itself is housed in a special room directly below the antenna and is connected to it by a 225 ft. concentric transmission line. The antenna and the major portion of the transmission line is supported by a 200 ft. tower which rests on columns above the roof of the warehouse.

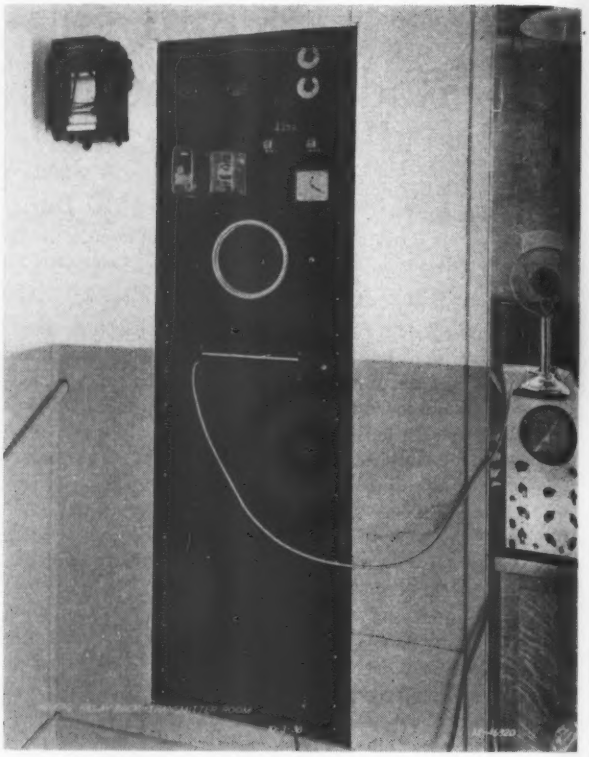
The Line Board has been in operation for a number of years as a dispatching center for the Detroit Division of the Overhead Lines Department. It was only logical that any aids to emergency dispatching be controlled from this point. Consequently, the control and frequency measuring equipment is installed here in accordance with the terms of our license.

One of the important pieces of radio equipment at this control point is the peak limiting amplifier. This device automatically compensates for the variations in the intensity of the dispatcher's voice. With so many dispatchers more or less inexperienced with microphones, this feature is desirable to permit anywhere near 100 per cent modulation. The carbon microphone feeds directly into the peak limiting amplifier, the output of which is connected to one of the leased telephone lines terminating at the transmitter. We are using a Western Electric 110A program amplifier. In laying out this dispatching system, we came to the conclusion that some type of warning signal should precede the emergency messages or test messages. As a result, a 1000 cycle tone oscillator has been incorporated in the equipment at the Line Board and is used to give the warning signal. The ultra-high frequency receivers which we use have an audio peak at about 1000 cycles and we have found that this note is readily distinguishable. The output of this tone oscillator uses the same input channel as the microphone. A station type receiver operates a speaker in the Line Board so that the dispatcher may know that the transmitter, six miles away, is functioning.

Any radio station license places certain restrictions on variations in the frequency of the transmitter. A General Radio type 620A frequency meter is used to check the frequency of the transmitter, and this equipment is located at the Line Board also. The dispatchers work in three 8-hr. shifts, and the frequency of the transmitter is measured at least once during each shift. In addition to this, we subscribe to a frequency



*W8XPQ control rack*



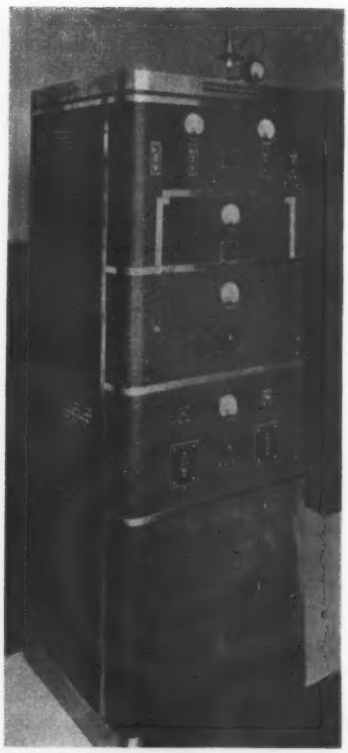
*W8XPQ relay rack transmitter room*

measuring service which is recognized by the Federal Communications Commission. Measurements are made bimonthly and are reported to us.

To control the transmitter, a switch is installed on the control panel. This switch allows a 48-volt source of direct current to be connected to one of the telephone lines terminating at the transmitter for control purposes. A jack strip at the control panel allows us to cut into all of the major control circuits quite readily.

The radio messages themselves are written on individual dispatch forms and are time stamped at the time of transmission. Each of these messages is numbered separately and a separate file of completed messages is maintained for inspection by representatives of the Federal Communications Commission. In addition to this, a station log at the Line Board shows the nature and time of all transmissions form this point, including any transmissions for test purposes.

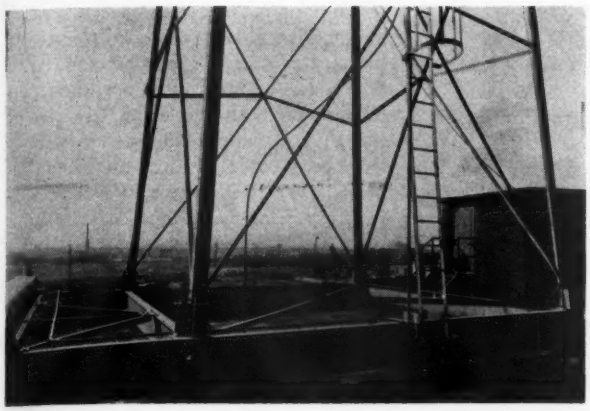
The telephone lines from the Line Board which are used in this work terminate at a relay rack in the transmitter room at Fenkell Warehouse. This room houses the transmitter and its auxiliary equipment. The transmitter, a complete unit, is a 150-watt General Electric type 4G2C1. The speech amplifier incorporated in this transmitter is capable of amplifying a signal from a carbon microphone sufficiently to completely modulate the carrier. Provisions have been made in the circuits supplying power to the transmitter and its associated equipment at Fenkell Warehouse whereby service is normally supplied from a distribution circuit fed from one substation. In the event of failure of this source of supply, an automatic throwover switch connects the power supply for this equipment to a second source of power from a distribution circuit fed from a different substation.



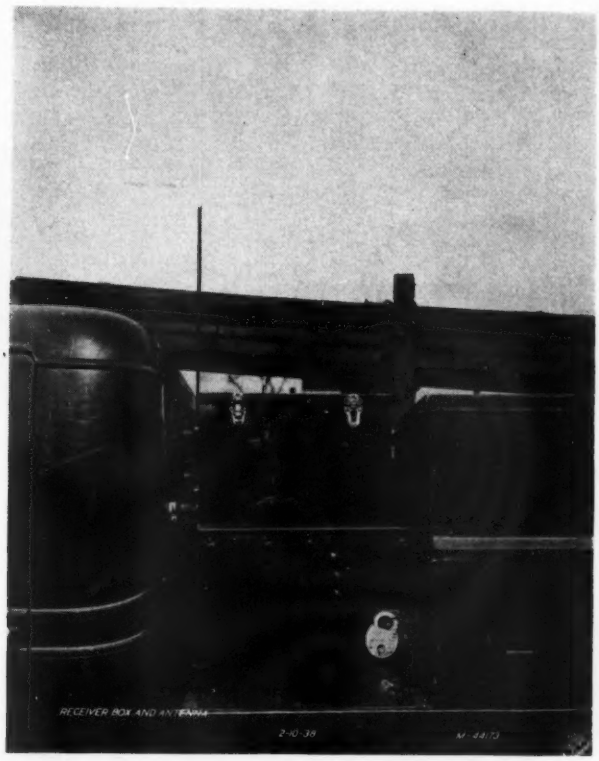
*W8XPQ transmitter*

A jack strip is mounted on the relay rack in the transmitter room at the warehouse into which a carbon microphone may be plugged for dispatching or testing from this point if necessary. An hour meter and a telechron clock, mounted on this rack, indicate the integrated hours of operation of the transmitter. Likewise, the control equipment for the tower lighting system is mounted here. This equipment consists of a Weston model 709 relay. The light collector itself is installed at the platform about one-third of the way up the tower.

Since this tower is quite a landmark in the north section of Detroit, relays in



*W8XPQ tower foundation*




*Receiver box and antenna*

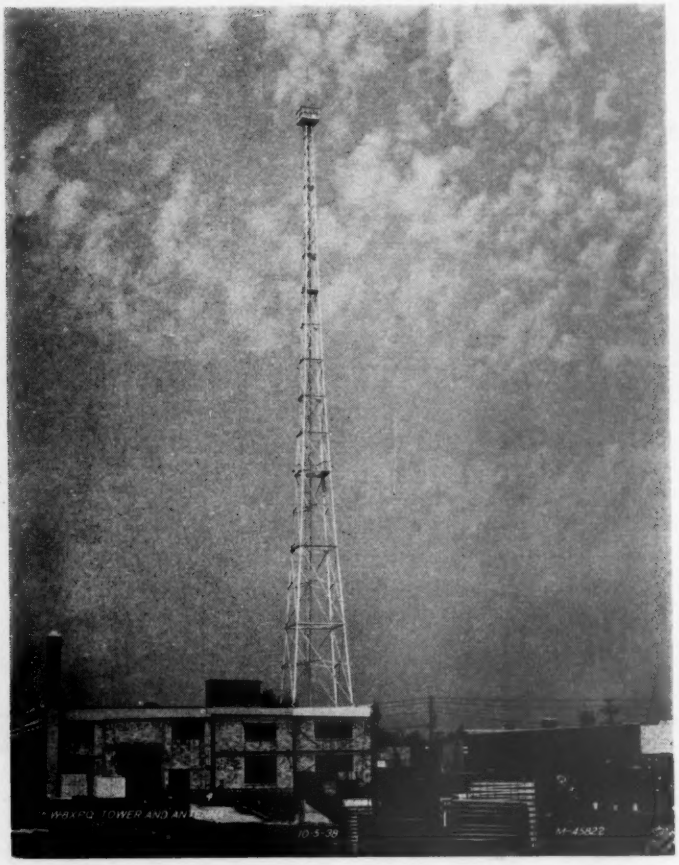
the tower lighting circuit are so designed and adjusted as to cause a red signal light to glow at the Line Board on failure of any of the lights on the tower. The problem was somewhat complicated by the fact that the lantern at the top of the tower flashes about 25 times per minute, whereas the other lights burn continuously at night.

At the top of the tower we are using a closed "J" type antenna consisting of a ¼ wave matching section and a ¾ wave radiator. The bottom of the matching section and the bottom of the radiator are grounded to the tower. The matching section is fed by a nitrogen filled Isolantite-insulated, concentric transmission line which continues down the tower through the warehouse roof directly to the transmitter.

The tower itself and its associated equipment form probably one of the most impressive single items in this system. When Fenkell Warehouse was built, provision for a water tower at the southeast corner of the warehouse was incorporated in the design. It was later found unnecessary to construct this water tower and consequently this existing foundation, with a small amount of bracing, was found adequate to support the radio tower structure. The method used for capping the columns was so arranged as to provide for the tower footings which did not match the columns themselves. In this work we were, indeed, fortunate in having a very good foundation 30 ft. above grade. We were able to purchase the tower at a very low figure from a local broadcasting company which had recently erected a new vertical antenna and was glad to dispose of this fixture. The Civil Aeronautics Authority prescribes the lighting and painting of such towers, and the alternate stripes of international orange and white painted on the tower are in accordance with regulations. Likewise, the marker lights on the tower legs at one-third the height and at two-thirds the height, as well as the flashing beacon, are in accordance with these regulations. In making the adjustments to the antenna, a telephone circuit to the top of the tower from the transmitter room proved to be a great asset. This circuit, as well as the transmission line, is fastened to the tower directly adjacent to the steel ladder which is enclosed by a safety cage. To facilitate changing of the marker lamps, platforms are provided at the one-third and two-thirds levels. The platform at the top of the tower is 6 ft. square and is surrounded by a 4-ft. railing.

Numerous public utility companies have written to The Detroit Edison Company requesting information on this installation. Almost without exception we are asked questions on cost. While we realize that the matter of cost is of prime interest, we have always stressed the fact that our charges to this system certainly will not apply to some other installation in another company. For instance, the height of the top of our tower is approximately 230 ft. A good tower foundation was available and we were able to purchase a used tower at a very reasonable cost. We were fortunate in being able to locate the transmitter room directly below the tower. Fenkell Warehouse, moreover, is well centered with respect to the boundaries of the Detroit Division and is within reasonable distance from the General Office building at which the Line Board is located. Our tests have shown, moreover, that with the present power of the transmitter, 150 watts, and the present antenna height, all sections of the Detroit Division with a radius of approximately 15 miles are covered at these short wave lengths.

The receiving equipment consists of RCA ultra-high frequency mobile receivers and its associated antennas. Trucks and cars equipped with these receivers are also equipped with heavy duty generators. The success of our system depends, in large measure, on the favorable location of the receiving antennas on the trucks. The receivers are mounted in steel boxes located well up on the truck bodies, and the lower ends of the antennas are attached to these boxes. This places the antennas at good height to avoid directional effects. Speak-



*W8XPQ tower and antenna*

ers are mounted over the windshields in the trucks and the on-and-off switches for the receivers are mounted on the dash boards.

Our method of handling emergency radio dispatching has been set up to meet the limitations of one-way radio communication. An emergency, incidentally, may be roughly defined as a hazard or potential hazard to life or property. When an emergency develops, the operator places the warning signal on the air four times. He then gives the number of the crew wanted and requests the crew to call the Line Board. Following this, in the same radio call, he gives the nature and location of the trouble. The crew proceeds to the location as soon as possible but must call in at the earliest possible time. In most instances, this call is made from a gasoline station on the way to the emergency. It is only in this way that the Line Board dispatchers know whether or not the crew has received the call. Therefore, the call is repeated at 2-min. intervals until telephone communication is established with the crew. The dispatcher, of course, knows whether or not the transmitter worked properly from the message coming through the station receiver at the Line Board. Once each half hour a short test transmission is made as a means of checking the overall performance of the system. This test is made in accordance with the F.C.C.'s regulations.

The emergencies with which we have had to deal have been mainly confined to wires down. Our very first emergency after the station went into operation was reported as wires down and arcing, with children playing nearby. Telephone contact was established with the desired crew within 2 min. after the call was placed on the air. The trouble was cleared 20 min. after the report was received from a customer. This case has proven fairly representative of most cases. Past experience in emergencies created by automobiles striking poles showed us that the major delay in clearing wires from the streets resulted from our inability to contact the pole haul trucks. These trucks are now equipped with ultra-high frequency receivers.

The F.C.C. requires that all radio messages be filed and be available to its representatives. We are also required to keep a log of the station operation. In cooperation with the Field Division of the F.C.C., simple changes in routines have been made to meet these requirements. We have enjoyed the most satisfactory relations in our dealings with the F.C.C. and its local representatives. No unusual or burdensome routines are required and, for our part, we are adhering rigorously to the regulations laid down for this class of service.

To date, our experience indicates that we are justified in making the expenditures for this system. To our knowledge, there is no other method, regardless of cost, which will allow a public utility to eliminate hazardous conditions with such speed. Two-way radio and some type of selective signalling would, of course, be desirable additional steps in this direction. Our experience to date shows that the system is reliable and that breakdown in any individual receiver unit is promptly noted and called to the attention of the dispatching source. With few exceptions, such troubles as have been experienced with the transmitting equipment have not prevented the proper handling of emergency situations. We have every reason to believe that as time goes on the use of radio by public utilities for emergency dispatching work in congested areas served by overhead lines will be a well established practice.

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STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF MARCH 3, 1933

Of EDISON ELECTRIC INSTITUTE BULLETIN, published monthly at Philadelphia, Pa., for October 1, 1938.

State of New York.
County of New York.

Before me, a Notary Public in and for the State and county aforesaid, personally appeared Wilgar Coleman, who, having been duly sworn according to law, deposes and says that he is the Editor of the EDISON ELECTRIC INSTITUTE BULLETIN, and that the following is to the best of his knowledge and belief, a true statement of the ownership, management . . . etc., of the aforesaid publication for the date shown in the above caption, required by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations . . . to wit:

1. That the names and addresses of the publisher, editor, managing editor and business managers are: Publisher, EDISON ELECTRIC INSTITUTE, 420 Lexington Avenue, New York City; Editor, Wilgar Coleman, 420 Lexington Avenue, New York City; Managing Editor, none; Business Manager, none.

2. That the owners are EDISON ELECTRIC INSTITUTE, 420 Lexington Avenue, New York City, a mutual organization, not incorporated; Charles W. Kellogg, President, New York, N. Y.; F. H. Nickerson, Treasurer, New York, N. Y.; Bernard F. Weadock, Vice President and Managing Director, New York, N. Y.

3. That the known bondholders, mortgagees and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages or other securities are: None.

WILGAR COLEMAN.
Editor.

Sworn to and subscribed before me this 30th day of Sept., 1938.

(Seal) JESSIE R. GERMOND,
Notary Public, New York County.
(My commission expires March 30, 1940)

# National Accounting Conference to be Held Jointly by A.G.A. and E.E.I.

PLANS for the second national accounting conference of the electric and gas industries, which will be held this year under the joint sponsorship of the Edison Electric Institute and the American Gas Association, have been substantially completed. From the interest shown, the largest group of utility accountants ever to assemble in the United States will be gathered at the Palmer House in Chicago, December 12, 13, and 14, 1938. This central location was selected as a meeting point in consideration of the heavy attendance expected.

From New York to California, from Minnesota to Texas, and from neighborly Canada, suggestions have been received for topics to be discussed, and it seems certain that the attendance of last year's conference in Detroit will be more than doubled. The number of participants may well go over the 1000 mark.

### Joint Planning Committee

The ground work for the conference was laid during the past several months by a committee, representing both the Edison Electric Institute and American Gas Association and comprising the following individuals:

| | |
|---|---|
| G. H. Bourne | H. W. Hartman |
| H. E. Cliff | H. C. Hasbrouck |
| H. C. Davidson | Merle Rainey |
| H. A. Ehrmann | B. S. Rodey, Jr. |
| F. B. Flahive | Mae B. Woods |
| C. P. Zimmerer | |

### Registration

The Registration Desk will be open Monday, December 12, for the registration of those attending committee meetings on that day, and those who plan on attending the opening of the general session which will start promptly at 9:00 a. m. Tuesday morning.

### Policy of the Conference

The general session of this year's joint conference will be confined to matters relating to the broader aspects of accounting in the gas and electric industry. The principal themes are to be, first, on accounting economies, second, on ethics and accounting personnel training, and third, on depreciation and plant accounting problems.

The general sessions are to occupy two full days (the 13th and 14th). Monday, December 12th, has been reserved for the use of the group committees, several of which plan to have a rather extensive program in connection with the specialized work of their groups. This date has also been reserved for organization business and stated meetings of the committees.

Plans are being made for the preparation of papers on certain suggested topics which will be distributed at the committee meetings or at the conference in the event that lack of time will not permit of their presentation at the general session.

### A Number of Surprises Are Planned

Speakers of national reputation, representing governmental regulatory agencies as well as the educational, engineering, and the manufacturing phases of the business, will address the conference.

## THE PLANNING COMMITTEE

H. A. EHRMANN

H. E. CLIFF

H. C. HASBROUCK

F. B. FLAHIVE

REPRESENTING AMERICAN GAS ASSOCIATION—ABOVE

B. S. RODEY, JR.

G. H. BOURNE

C. P. ZIMMERER

H. C. DAVIDSON

REPRESENTING EDISON ELECTRIC INSTITUTE—ABOVE

H. W. HARTMAN, A.G.A.

MAE B. WOODS, E.E.I.

MERLE RAINEY, E.E.I.

## GENERAL ACCOUNTING COMMITTEES

In addition to the topics to be presented by the guest speakers, the General Accounting Committee of both the Edison Electric Institute and the American Gas Association will sponsor outstanding speakers on special subjects.

### Accounting Ethics

Mr. F. B. Flahive is slated to present one of the features of the opening day's program by a talk on accounting ethics and employe training.

### Elimination of Duplication of Reports to Governmental Bodies

Mr. W. T. Neel and Mr. W. G. Bourne, Jr., are scheduled to present the high points of their reports on "Elimination of Duplication of Reports to Governmental Bodies" which were offered to the Central Statistical Board in Washington on October 4th.

Other topics being considered for presentation at this session are:

(1) More useful accounting systems. Can any tangible monetary benefit be obtained from the elaborate accounting required by regulatory authorities, such as in the system of accounts, plant records, annual reports data, etc., which benefits might justify, and compensate for, the increased expenditures involved? What is the actual effect of such requirements on accounting and other costs, both field and office, and the general effect, if any, on cost of service?

(2) Can accounting mechanisms be created to permit the company to determine the balance which it is maintaining between those costs which do not increase or recede with the volume of business, and on the other hand, the amount produced by the fixed charge sections of the rate schedules?

(3) Effective means of budgetary control-accounting devices, graphs, charts, etc., to measure the effectiveness of budgets as compared with actual performances.

Among the talks by speakers of outstanding reputation will be those on such topics as the "Significance and Importance of Accounts and Accounting in Matters Before the S.E.C."; "Significance of Uniform Accounts in Finance, with particular stress on original cost, and property accounts"; and the "Use of Accounts and Accounting Analyses in Rate Determinations."

Time permitting, a paper on "Some Fallacies of Original Cost Accounting" will be presented.

### Typical Broad Topics for Consideration

The efforts of arranging for the final details are largely under the auspices of the chairmen and membership of the individual gas and electric accounting committees, who are now busily engaged in whipping into shape a program destined to acquaint the membership at large with the progress attained by the specialists in their respective fields.

Numerous suggestions of timely topics for presentation have been received and referred to the respective group chairmen to be given consideration in planning the program to be sponsored by them at the general session.

## PLANT ACCOUNTING AND RECORDS COMMITTEES

### Methods of Installing Continuing Property Records

Outstanding on the program to be presented by this group will be a talk by a prominent engineer on "Methods of Installing Continuing Property Records" which is expected to indicate to the companies the possibility of huge savings in connection with this phase of their accounting work.

Additional topics now being considered for presentation by this committee are:

(1) Classifying the difference between original cost, as determined by analysis or appraisal, and cost to the companies. Also problems with reference to the use and treatment of the Acquisition Adjustment Account.

(2) Problems involved in complying with the order of the Federal Power Commission on May 11, 1938, referring to electric plant instruction 2-D. Extent to which compliance has been achieved.

(3) Reiteration of the place of the engineer in the field of property accounting and correspondingly the place of the accountant, a problem deserving of further attention from the standpoint of the most economical way to operate property records in the particular companies without too much overlapping and duplication of organization.

(4) The matter of construction overheads, particularly from the angle of the requirements of the new systems of accounts.

Plant instructions 5, Components of Construction Costs, and 6, Overhead Construction Costs. Introduction of the subject with a brief discussion of the various overhead construction costs. How overheads should be determined; that is, by means of study, time tickets, judgment, etc.

The method or manner of accumulating such overheads by types or kinds, and the distribution or apportionment thereof to the various jobs and thence to plant accounts. The relative merits of distributing construction overheads directly to jobs as against distributing overheads to overhead clearing accounts and then prorating to jobs and plant accounts on applicable basis such as material costs, labor costs, etc.

(5) The extent and possible application of the unit man-hour basis in distributing cost to construction accounts.

(6) Retirement units and retirement practices in connection with overhead and underground distribution systems.

(7) Continuing Property Record Units versus Retirement Units. Useful distinction; units used as standards in conjunction with maintenance and retirement practices versus units used for convenient segregation of property record costs in perpetuating continuing property records.

Other suggested topics include: (a) Accounting for changes in property leased from others, (b) Extent to which General Equipment is Charged to the Plant Accounts or to Operating Expenses, (c) Practice of Accounting for Replacement of Gas Mains and Gas Services either through the Plant Accounts or Operating Expenses.

## DEPRECIATION COMMITTEES

Closely connected with the work of the Plant Accounting and Records Committee is that of the Committee on Depreciation.

Considerable work has been done by this group during the past year. The Conference will be addressed by the respective chairmen of the depreciation Committees of both associations, Mr. C. E. Kohlhepp and Mr. H. C. Hasbrouck. Of special note is the work done under the direction of Messrs. H. C. Davidson and H. L. Gruehn, who will also address the gathering and report on the accomplishments of the committee work to date.

This group is also cooperating with the Institute's staff in a study on the treatment of the subject of depreciation before courts and commissions.

### Economics of Obsolescence

This Committee will also sponsor talks on the latest developments in depreciation accounting and on current depreciation theories and practices. As a special feature it will present an address by a speaker of national prominence on "Some Engineering Factors Affecting Obsolescence."

## CLASSIFICATION OF ACCOUNTS COMMITTEES

### An Accountant is Perplexed

As part of the program of this Committee, a surprise presentation is promised in the form of an address before the conference by Mr. Francis J. Brett, a hint of which may be gained from the title given above.

Other topics presented by this Committee will deal with the all-important subject of prescribed systems of accounts and related matters. Specific titles of talks in this division, considered for presentation, include:

(1) Problems in joint facility accounting.

(2) Conflicting Accounting Standards. For instance, the property accounting prescribed for the railways as contrasted with gas and electric utilities and both as contrasted with principles followed by industrial enterprises. How do they square with so-called accepted principles of accounting?

(3) A practical account of a company's experience in putting into effect the NARUC Code of Accounts.

(4) How shall the cost, labor, material and expense of installing a system of continuing property records and the cost of determining original cost of utility property be charged on the company's books? What specific accounts should be charged in either event?

(At least one theory of original cost determination calls for an inventory of all electric property and such practice will set up very heavy costs which cannot be associated with rate cases because the inventory is for the sole purpose of arriving at a base for original cost, and in many instances a base for continuing property records and future retirements. Can these costs be thrown into Operating Account 797 on the theory that they are imposed by regulatory commission requirements or should they be capitalized under the broad general theory expressed in Account 301?)

## CUSTOMERS' RELATIONS, COMMERCIAL ACCOUNTING AND COLLECTIONS COMMITTEES

These Committees are planning a large special session on Monday. At the general session they will present a series of talks which will deal with the more important phases and new developments in this field, particularly those affecting economies.

Among some of the topics which may be presented at the general session are:

(1) Some of the principal problems in joint gas and electric reading, indexing, and billing.

(2) Developments of possible economies and some specific data and information regarding consumers' deposits.

(3) A study of the principal five or six steps involved in reading, indexing, billing and collection of revenues with the author's views on the possibilities for economies in the several steps under varying conditions. The possibilities of having the electric or gas meters show the consumption and amount due in dollars and cents with the possible further result of having the customer read his own meter and remit the amount due, subject to a later periodical verification by the company's men. Also, the possibilities of a meter reader computing the amount due with the assistance of a lightweight comptometer, and delivering the bills in one operation.

(4) Possible Economies in Commercial Accounting Costs.

Other suggested topics include: (a) Financing Merchandising Activities—Discounting and Selling Customers' Contracts; (b) Credit versus Deposits; (c) Maintaining Good Public Relations in a Collection Department.

## PURCHASING, STORES AND TRANSPORTATION COMMITTEES

The specialized accounting work coming under the jurisdiction of this Committee has received more and more attention in the recent years of enforced economy. The matter of affecting economies will be the keynote of this Committee's presentation.

The items considered for presentation are:

(1) Salvage Operations and New Developments in Accounting for them.

(2) Economies in taking physical inventories of Materials and Supplies.

(3) Accounting for transportation expense.

(4) Use and Misuse of Blanket Purchase Orders.

### Conference Jointly Sponsored

The planning for these conferences has been guided by the consideration that the participants are interested in serious work. In view of the importance of the work to be accomplished and the limited time of those attending, no entertainment is planned.

An informal dinner will be held Tuesday evening, at which two authorities of nationwide renown will address the members on accounting subjects.

As has already been stressed, all operations of the Conference are sponsored jointly by the Edison Electric Institute and the American Gas Association.

Due to the unusually large attendance expected, our members are advised to make reservations well in advance.

*Further information in regard to the program may be obtained from the chairmen of the respective groups or the staff of the American Gas Association or the Edison Electric Institute.*

The programs are being rapidly formulated by the various Accounting Committees. It is expected that complete programs will be issued one month in advance of the Conference date, and published in the November issue of the EDISON ELECTRIC INSTITUTE BULLETIN.

*(Please make your hotel reservations direct with the Palmer House, Chicago, Illinois.)*

A list of the committees that are active on the Edison Electric Institute side of the program follows:

### GENERAL ACCOUNTING COMMITTEE

MR. RODEY

*Chairman,* B. S. RODEY, JR., Consolidated Edison Co. of New York, Inc., New York, N. Y.

*Vice-Chairman,* G. H. BOURNE, The Commonwealth & Southern Corp., New York, N. Y.

H. D. ANDERSON, American Gas & Electric Service Corp., New York, N. Y.

J. H. BISSELL, Stone & Webster Service Corp., Boston, Mass.

KAISER E. BOYLE, The Dayton Power & Light Co., Dayton, Ohio.

F. J. BRETT, Niagara Hudson Power Corp., New York, N. Y.

E. S. BROCK, Public Service Electric & Gas Co., Newark, N. J.

A. B. CARPENTER, San Joaquin Light & Power Corp., Fresno, Cal.

R. B. CURRAN, The Connecticut Power Co., New London, Conn.

H. C. DAVIDSON, Consolidated Edison Co. of New York, Inc., New York, N. Y.

F. B. FLAHIVE, Columbia Gas & Electric Corp., New York, N. Y.

H. L. GRUEHN, Consolidated Gas, Electric Light & Power Co., Baltimore, Md.

C. E. KOHLHEPP, Wisconsin Public Service Corp., Milwaukee, Wis.

J. M. KRAMARSIK, The Connecticut Light & Power Co., Hartford, Conn.

B. M. LESTER, Oklahoma Gas & Electric Co., Oklahoma City, Okla.

J. H. LOBBAN, The Detroit Edison Co., Detroit, Mich.

G. U. STEWART, Philadelphia Electric Co., Philadelphia, Pa.

EMIL ULBRICHT, Public Service Electric & Gas Co., Newark, N. J.

C. P. ZIMMERER, Ebasco Services, Inc., New York, N. Y.

### CLASSIFICATION OF ACCOUNTS COMMITTEE

MR. CURRAN

*Chairman,* R. B. CURRAN, The Connecticut Power Co., New London, Conn.

*Vice-Chairman,* J. H. MORRELL, Niagara Hudson Power Corp., New York, N. Y.

NELSON J. AMBROSE, Stone & Webster Service Corp., New York, N. Y.

R. B. BOYLE, Texas Electric Service Co., Fort Worth, Texas.

J. W. GLENDENING, The Commonwealth & Southern Corp., New York, N. Y.

N. W. HAIGHT, Columbia Engineering Corp., New York, N. Y.

A. M. HARTOGENSIS, Ebasco Services, Inc., New York, N. Y.

ERNEST S. LANNING, Public Service Electric & Gas Co., Newark, N. J.

M. J. MILEY, Consolidated Edison Co. of New York, Inc., New York, N. Y.

FRANK J. MOYLAN, Nebraska Power Co., Omaha, Neb.

P. D. PREGER, The North American Co., New York, N. Y.

T. E. ROACH, Washington Gas & Electric Co., Tacoma, Wash.

P. R. WILLIAMS, Virginia Electric & Power Co., Richmond, Va.

### PURCHASING, STORES AND TRANSPORTATION COMMITTEE

MR. BROCK

*Chairman*, E. S. BROCK, Public Service Electric & Gas Co., Newark, N. J.

K. C. CAMPBELL, The Detroit Edison Co., Detroit, Mich.

R. N. DOWLING, New Orleans Public Service, Inc., New Orleans, La.

C. W. ENGSTROM, American Gas & Electric Service Corp., New York.

R. H. CLARK, Consolidated Edison Co. of New York, Inc., New York, N. Y.

J. A. HERLIHY, Boston Edison Co., Boston, Mass.

W. M. HOLLS, Consolidated Gas, Electric Light & Power Co., Baltimore, Md.

J. KROHN, Consolidated Edison Co. of New York, Inc., New York, N. Y.

W. P. MCARDLE, Ebasco Services, Inc., New York, N. Y.

J. J. MCDONNELL, Kansas City Power & Light Co., Kansas City, Mo.

G. MCDOUGALL, Consolidated Edison Co. of New York, Inc., New York, N. Y.

R. W. SEIPEL, Texas Electric Service Co., Fort Worth, Texas.

CARL H. ZURNEIDEN, Philadelphia Electric Co., Philadelphia, Pa.

### PLANT ACCOUNTING AND RECORDS COMMITTEE

MR. ANDERSON

*Chairman*, H. D. ANDERSON, American Gas & Electric Service Corp., New York, N. Y.

*Vice-Chairman*, J. V. CLEARY, Consolidated Edison Co. of New York, Inc., New York, N. Y.

GEORGE K. CAMPBELL, Columbia Gas & Electric Corp, New York, N. Y.

F. W. COOPER, Public Service Electric & Gas Co., Newark, N. J.

K. B. CRUMB, American Gas & Electric Service Corp., New York, N. Y.

J. U. DIEHL, Pennsylvania Water & Power Co., Baltimore, Md.

W. H. EBBECKE, The United Gas Improvement Co., Philadelphia, Pa.

H. W. ENDRES, American Gas & Electric Service Corp., New York, N. Y.

S. L. FERGUSON, The Detroit Edison Co., Detroit, Mich.

H. B. HARDWICK, The Commonwealth & Southern Corp., New York, N. Y.

S. W. KITTLEMAN, Arkansas Power & Light Co., Pine Bluff, Ark.

J. M. KRAMARSIK, The Connecticut Light & Power Co., Hartford, Conn.

G. T. SWISHER, The Potomac Edison Co., Frederick, Md.

J. L. SUNDAY, Philadelphia Electric Co., Philadelphia, Pa.

H. P. TAYLOR, Wisconsin Public Service Corp., Milwaukee, Wis.

H. M. TICKLE, The Commonwealth & Southern Corp., Birmingham, Ala.

MORRIS TRACY, Niagara Hudson Power Corp., Syracuse, N. Y.

### CUSTOMERS' RELATIONS, COMMERCIAL ACCOUNTING AND COLLECTIONS COMMITTEE

MR. BOYLE

*Chairman*, KAISER E. BOYLE, The Dayton Power & Light Co., Dayton, Ohio.

*Vice-Chairman*, E. N. KELLER, Philadelphia Electric Co., Philadelphia, Pa.

J. H. AIKEN, Consolidated Edison Co. of New York, Inc., New York, N. Y.

P. J. BRAHENEY, Minneapolis General Electric Co., Minneapolis, Minn.

EDWARD A. DRISCOLL, Public Service Electric & Gas Co., Newark, N. J.

W. D. DYER, Boston Edison Co., Boston, Mass.

P. F. GOW, Kansas Gas & Electric Co., Wichita, Kan.

R. C. JONES, San Antonio Public Service Co., San Antonio, Texas.

L. M. LAPORTE, The Milwaukee Electric Railway & Light Co., Milwaukee, Wis.

W. R. SEIDEL, Rochester Gas & Electric Corp., Rochester, N. Y.

H. T. TERRY, Pacific Gas and Electric Co., San Francisco, Cal.

O. J. VOSBRINK, Union Electric Co. of Missouri, St. Louis, Mo.

W. H. WATERBURY, American Gas & Electric Service Corp., New York, N. Y.

JOHN A. WILLIAMS, Niagara Hudson Power Corp., Syracuse, N. Y.

### DEPRECIATION COMMITTEE

MR. KOHLHEPP

*Chairman*, C. E. KOHLHEPP, Wisconsin Public Service Corp., Milwaukee, Wis.

*Vice-Chairman*, H. L. GRUEHN, Consolidated Gas, Electric Light & Power Co., Baltimore, Md.

G. H. BOURNE, The Commonwealth & Southern Corp., New York, N. Y.

J. M. BURCHILL, American Gas & Electric Service Corp., New York, N. Y.

W. V. BURNELL, Stone & Webster Service Corp., Boston, Mass.

A. B. CARPENTER, San Joaquin Light & Power Corp., Fresno, Cal.

H. C. DAVIDSON, Consolidated Edison Co. of New York, Inc., New York, N. Y.

E. D. DREYFUS, West Penn Power Co., Pittsburgh, Pa.

F. B. FLAHIVE, Columbia Gas & Electric Corp., New York, N. Y.

G. G. JEWETT, Boston Edison Co., Boston, Mass.

J. M. KRAMARSIK, The Connecticut Light & Power Co., Hartford, Conn.

H. W. ROSS, Union Electric Co. of Missouri, St. Louis, Mo.

E. C. SCOBELL, Rochester Gas & Electric Corp., Rochester, N. Y.

G. U. STEWART, Philadelphia Electric Co., Philadelphia, Pa.

EMIL ULBRICHT, Public Service Electric & Gas Co., Newark, N. J.

C. P. ZIMMERER, Ebasco Services, Inc., New York, N. Y.

## Our Accounting Chairman Receives Degree of Juridicae Scientiae Doctor

BERNARD S. RODEY, JR., Chairman of the General Accounting Committee, has received the degree of Doctor of Juridical Science, after writing a thesis which proves to be of particular interest to the electrical industry. This thesis, a 30,000 word essay, is entitled "The Lay Meaning and Legal Significance of the Terms 'Original Cost,' 'Historical Cost,' and 'Prudent Investment'," and includes *"A New Plan To Settle A Fifty Year Old Problem."*

These terms, particularly the phrase "Original Cost," had long been taken for granted. Dr. Rodey established that even scientific authorities, not excluding the United States Supreme Court, used six or seven different terms when apparently always meaning original cost, and that, furthermore, there was marked disagreement as to the meaning of the term itself. It goes without saying that the effort to establish uniformity of concept in a term that has come to the forefront of utility accounting by virtue of the various Uniform Systems of Accounts, constitutes a substantial contribution to the law governing the regulation of our industry.

Much of the research for the thesis is included in a "Digest of Authoritative Opinions of The Definition of 'Original Cost'" which recently has been distributed by the Edison Electric Institute to interested accountants.

# Do Sales Mean Jobs?

## Consolidated Edison Gives New York an Answer

By C. E. Greenwood
*Commercial Director, Edison Electric Institute*

THE germ of a big idea was planted this past summer by a prominent industrialist who was on the program of our Edison Institute Convention. It was a practical one too. Mr. George W. Mason, president of Nash-Kelvinator Corporation, a man just as keen on the subject of mass merchandising as he is on executive planning and on balancing budgets, concluded that the first link in the re-employment chain was to rehabilitate the art of Selling. Not only sales revival of the products of his own company, but stimulation in every field—automobiles, electrical equipment, building construction and running the entire gamut of distribution.

"SALES MEAN JOBS," said Mr. Mason, and after putting his own organization to work to carry the banner, he arranged for local Chambers of Commerce to forward a country-wide movement among all of its members.

There is no group that can be counted upon more for participation in civic betterments or for advancement of such a constructive and economically sound concept as SALES MEAN JOBS than the utilities. Members of the Edison Electric Institute and others have joined in hearty response. The idea immediately clicked with the *thinking* of commercial executives.

Should there be a skeptic who would query "DO SALES MEAN JOBS?" let him read the plan that E. F. Jeffe, vice-president, Consolidated Edison Company of New York, created for the sale of electrical household equipment, and the positive answer that SALES RESULTS are giving in a three months' campaign now being conducted. This is a direct tie-in with the national movement.

"We will make JOBS FOR MEN," says Mr. Jeffe, through the most aggressive sales effort that has been recorded in many years. By stepping up sales through organized, coordinated effort with our own Sales Department, the entire body of employees of the Edison System, and a forceful body of approved dealers making thousands instead of hundreds of units, Consolidated Edison will contribute liberally to business recovery by sending a few thousand men back to work in the factories. And what is most worthy of reference—electrical consumers will be given a veritable bargain in high-grade electrical appliances at a time when household budgets are already depleted.

It is not surprising that Mr. Floyd L. Carlisle, chairman, Consolidated Edison System, who is an ardent advocate of real recovery measures and a sales-minded utility executive, approved this campaign for the common advantages to be gained in promoting the Edison Bargain Package.

Without going into too much detail in this review of the first month of the campaign, it should be noted that the duration is for four months. It started Sept. 1. The Package includes a General Electric ac-dc push-button electric tuning radio; an Artistic 6-way IES floor lamp complete with bulbs; a Westinghouse ac-dc automatic iron, and a Proctor Turn-O-Matic toaster.

The lot sells for $24.50 plus a sales tax of 49 cents (New York City). The regular value is given at $53.25 which makes the package a bargain indeed. But customers of the System may buy at $2.99 down and $2 monthly for 11 months without any financing charge. The company is doing the advertising and financing for the dealer, and all sales obtained by company salesmen or employees are placed through the dealer.

The potentialities of this major cooperative venture are already in evidence as one follows the record to date.

*Floyd L. Carlisle, chairman, Consolidated Edison System, examines the items that Vice-President E. F. Jeffe will sell in his Bargain Package and gives approval for full speed ahead*

There are six partners in the transaction —the Company, the Employees, Customers, Dealers, Stockholders and the Factory Workers. Let's note how each group is being affected at the first quarter turn of the sales speedway.

The chief measure of *Company* benefit from such an intensive domestic load building project can only be registered in kilowatt-hours. The answer, therefore, must be long deferred. At present the company is bearing the largest share of the financial burden of distribution as a contribution to business recovery, and is looking forward to its commercial advantage as the thousands of purchasers express content with their new devices through USE. In 30 days, 62,273 packages of four devices have been sold, representing a public response which is highly gratifying.

In this campaign the interest of the *Employee* has been enlisted to help make it the record breaker among utility merchandising activities. They gain a material advantage since each employee is paid $1 for every sale which is brought in. The first month employees have earned $38,368 in commissions.

What about competing *Dealers?* Naturally there were those in the large dealer group of Metropolitan New York who were not immediately sold on this volume sales plan which Mr. Jeffe had created. There is but $4 profit on the individual sale. But—and it is a large BUT—for every sale he makes from his store, one made by a representative of "Consolidated" is placed through him with a further clean profit of $3. There is a gross of 14 per cent and the dealer has no advertising, financing and very little sales expense which are major items in the accounting system. These facts are pointed out not in justification of a sale of this kind as a money-maker for the dealer, but to clarify any misunderstandings that might occur in a superficial review of the entire proposition. Above all, it should be borne in mind that this is a give-and-take proposition in the interests of JOBS FOR MEN, and the dealer is asked to bear part of the burden. The best answer to any question of dealer reaction is in the fact that during the first months, dealers made from their stores 23,905 sales with commissions totaling $210,724.

A utility company belongs to its *Security Holders,* and there can be no doubt that the successful culmination of the campaign, with the many thousands of new and useful appliances that will go into the homes of customers of the Consolidated Edison System, will bring substantial revenues to the company. This, no doubt, was another potent reason for Mr. Carlisle to give his unqualified approval to this mass attack on the appliance market. Meanwhile the company leads the way in a stupendous offensive against unemployment.

The objective will be gained. This ingeniously planned and effectively organized attack is already showing results. More car-loads of irons, more car-loads of radios, more car-loads of portable lamps and more car-loads of toasters heading for New York mean all along the line more JOBS FOR MEN. More than 700 additional sales people are at work in the communities covered by this campaign. One manufacturer is working three shifts to turn out the orders from "Consolidated" in addition to his regular business. Each manufacturer that is building an item for the Bargain Package says these orders are sharply increasing employment, adding to purchasing power and to factory morale. The largest single orders ever placed for electrical appliances are even now being followed with re-orders.

The campaign was launched at a luncheon of 900 approved appliance dealers held at the Hotel Commodore, New York, on Aug. 31. Over 700 of them fell into line and are carrying the banner. This is Edison's Greatest Bargain Package of electric necessities. The close of the campaign will without question bring results which have been unequalled in any merchandise venture of the utility companies.

Who is not convinced that SALES MEAN JOBS for men?

## What the Utility Business Offers

(*Continued from page* 429)

it practical to see a maximum of good in the persons for whom I worked, even though I was not blind to their weaknesses or faults, and I have always found that I could honestly and conscientiously admire them for their many good qualities. Remember: "Hard masters make strong men." Never shirk or dodge responsibility. If a mistake is made, admit it and take the consequences. Hard as it may be at the time, the ultimate effect will be beneficial. If I had my way, boxing would be compulsory at schools, so that more boys would learn to "take it on the chin" in addition to the many other benefits that come from that sport, such as teaching the control of temper.

Equally as important as faithfulness to one's superiors is faithfulness to one's subordinates, seeing to it that they get a square deal. I do not mean by this to be easy on them and not exacting of proper results, for nothing is more unkind.

Be careful to manage your own private affairs in such a way as to justify the confidence of your superiors. No one is entitled to a position of responsibility, where he has management over his company's affairs, particularly where control of expenditures of money is concerned, if he has not demonstrated the ability to manage his personal, private affairs well.

In concluding and summing up: strive to be master of your affairs rather than a victim of circumstances. The particular moment when opportunity comes to a person may sometimes be luck, but the ability to grasp the opportunity is within the control of the individual. This world is a wonderful equalizer and one receives very little for nothing. The young man should make up his mind that, in some way or other, he will have to pay for practically everything he gets. After all, one of the greatest satisfactions of life comes from accomplishment.

## World Power Conference Papers Will Be Printed

THE United States Government Printing Office, office of the Superintendent of Documents, Washington, D. C., has advised that but one printing of the transactions of the World Power Conference held in Washington in September, 1936, and the Second Congress on Large Dams will be made.

It was said that since the size of this printing must be determined by the response, it is important that orders for the ten volumes must be made at once either to the national committee or to the American National Committee. Otherwise, it was said, it may not be possible to fill later requirements. The ten volumes of 7,500 pages can be had for $22 a set. They will contain all papers presented at the sessions.

# RECENT PUBLICATIONS

## TEST SPECIFICATIONS, AUTOMATIC ELECTRIC STORAGE WATER HEATERS

E.E.I. Pub. F-8. A report of a Joint Committee of the Edison Electric Institute and National Electrical Manufacturers Association, 9 pages. Price 20¢ to members and their employees; 50¢ to non-members in the U.S.A.; 60¢ to foreign countries.

THE purpose of these test specifications is to establish a procedure to make possible the determination of the performance of electric storage water heaters in terms of safety, effectiveness, durability and convenience with respect to minimum requirements.

## TREE TRIMMING PRACTICES

E.E.I. Pub. F-10. A report of the Accident Prevention Committee and the Transmission and Distribution Committee, Edison Electric Institute, 10 pages. Price 20¢ to members and their employees; 50¢ to non-members in the U.S.A.; 60¢ to foreign countries.

THIS report, issued jointly by the Accident Prevention Committee and the Transmission and Distribution Committee, covers in detail safe practices and suggestions to be used by the foremen in the field in charge of tree trimming work. The report is so designed that it will be valuable to field forces.

Trimming practices in general are discussed in the first part of the report. The second part of the report deals with tree trimming safety. General and specific safety rules are outlined.

A copy of this report should be placed in the hands of each foreman who may do any tree pruning. He will derive a great deal of benefit from a knowledge of the report, and will be in a better position to handle efficiently and well this work, and will have an appreciation of the essentials of good relations with tree owners.

## ELECTRIFICATION OF OIL REFINERIES

E.E.I. Pub. F-11. A report of the Industrial Power and Heating Committee, Edison Electric Institute, 16 pages. Price 30¢ to members and their employees; 75¢ to non-members in the U.S.A.; 85¢ to foreign countries.

THIS report contains data elaborating the following:

Oil Refineries, as a general rule, operate at about 73 per cent of their rated capacity.

Practically all oil produced in this country is refined to some extent in the 422 refineries of the U. S. A.

The present potential market for purchased power approximates 350,000,000 kwhr.

Electric power applications represent 44 per cent of the total power required in oil refineries, of which amount two-thirds is purchased and one-third generated privately.

Generation of electric power with internal combustion engines is apparently uneconomical.

Waste and non-marketable fuels provide almost one-half the total fuel supply of refineries.

New processes involving the use of refinery gases and elimination of formation of acid sludge may provide an additional market of 115,000,000 kwhr of purchased electric power.

Purchased electric power is used for practically all power requirements of certain refineries.

Location of refineries dictates the type of fuels consumed; transportation costs are an important factor.

Modern improvements by electric motor manufacturers have provided a wider field for purchased electric power application.

# Central Station Voltages for Lighting*

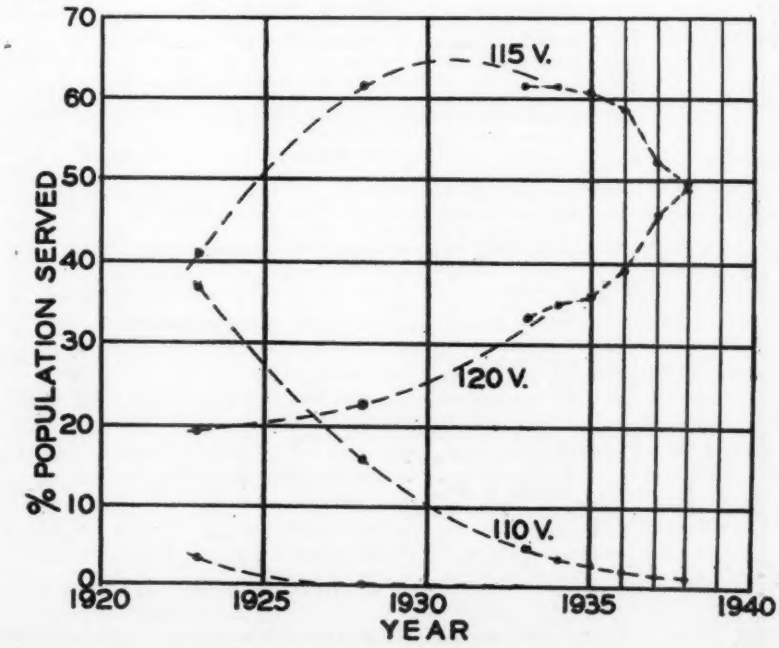
By G. S. Merrill
*General Electric Company*

OUR annual analysis of population reported as being served at various lighting voltages, shows a continued shift toward 120, with decreases in both the 115 and the 110-volt percentages. The percentage of population receiving lighting service at 125 and 130 volts is almost negligible (actually less than one-tenth of one per cent) and shows no sign of increasing. The trend is as shown in the following table, and is illustrated in the accompanying figure.

*Through an error in make-up, a cut showing reduction in the unit cost of light in residential service was used to illustrate Mr. Merrill's article under this heading last month. The correct figure is reproduced herewith.

PER CENT OF U. S. POPULATION IN AREAS SUPPLIED AT DIFFERENT VOLTAGES—100-130 VOLT RANGE

| Voltage | 1923 | 1928 | 1933 | 1937 | 1938 |
|---|---|---|---|---|---|
| 110 | 36.3 | 15.9 | 5.2 | 1.8 | 1.4 |
| 115 | 40.9 | 61.6 | 61.7 | 52.1 | 49.5 |
| 120 | 19.4 | 22.4 | 33.0 | 46.0 | 49.0 |
| All Others | 3.4 | 0.1 | 0.1 | 0.1 | 0.1 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Average Voltage (1st three items only) | 114.1 | 115.3 | 116.4 | 117.2 | 117.4 |




*Per cent of population reported as being served at various voltages for lighting—100-130 volt range*

# PUBLICATIONS OF THE INSTITUTE

| Pub. No. | | Date Issued | Price to Members | Price to Non-Members | Price to Foreign Countries |
|---|---|---|---|---|---|
| F1 | Treatment and Inspection of Creosoted Pine Poles | (2/38) | $0.30 | $0.75 | $0.85 |
| F2 | Inductive Coordination of Rural Power and Telephone Systems | (1/38) | .80 | 2.00 | 2.15 |
| F3 | Distribution Transformer Load Characteristics—1938 | (4/38) | 1.00 | 2.50 | 2.65 |
| F4 | The Electric Light and Power Industry in 1937 | (4/38) | .30 | .75 | .85 |
| F5 | Design of Switchhouses for Generating Stations and Transmission Substations | (6/38) | .40 | 1.00 | 1.10 |
| F6 | Lightning Proof Transmission Lines | (7/38) | .60 | 1.50 | 1.60 |
| F7 | Economical Distribution Transformer Loading and Thermal Performance of Distribution Transformers | (8/38) | .40 | 1.00 | 1.10 |
| F8 | Test Specifications, Automatic Electric Storage Water Heaters | (10/38) | .20 | .50 | .60 |
| F9 | Conductor Sags and Tensions for Rural Lines | (10/38) | .40 | 1.00 | 1.10 |
| F10 | Tree Trimming Practices | (10/38) | .20 | .50 | .60 |
| F11 | Electrification of Oil Refineries | (10/38) | .30 | .75 | .85 |
| E1 | Rectifier Wave Shape | (4/37) | .40 | 1.00 | 1.10 |
| E2 | The Electric Light and Power Industry in 1936 | (1/37) | .30 | .75 | .85 |
| E3 | Jointly Used Wood Pole Lines Specifications | (1/37) | .50 | 1.50 | 1.60 |
| E4 | Joint Use of Poles, 6.6 and 13.2 Kv, Safety Features | (1/37) | .30 | .75 | .85 |
| E5 | Principles and Practices for Inductive Coordination, A.A.R. and E.E.I. | (1/37) | n.c. | n.c. | n.c. |
| E8 | A-C Network Operation—1934-1935 | (6/37) | .70 | 1.60 | 1.75 |
| E9 | Characteristics of Power System Faults to Ground—Engineering Report No. 39 of the Joint Subcommittee on Development and Research | (11/37) | .60 | 1.50 | 1.60 |
| E10 | Power Station Chemistry—1937 | (9/37) | .30 | .75 | .85 |
| E11 | Combustion—1937 | (9/37) | .80 | 2.00 | 2.15 |
| E12 | Resuscitation Booklets | (7/37) | 119 copies .10 each<br>10-99 copies .08 each<br>100-499 copies .06 each<br>500-999 copies .04 each | | |
| E14 | Turbines, Condensers and Pumps—1937 | (9/37) | .60 | 1.50 | 1.60 |
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EDISON ELECTRIC INSTITUTE 420 Lexington Avenue, New York, N. Y.

*Lindemann Prize Paper*

# The Advantages of Electric Cookery for Domestic Purposes

By R. A. Gibson

WHY HAVE THE AMERICAN PEOPLE bought electric ranges in the past and why are they continuing to buy them in ever increasing numbers? Conversely, why have electric ranges which have been on the market twenty years or more not been accepted with greater enthusiasm by the American public? Why this continued furor about the advantages of electric cooking after twenty years of progress?

Is it not time for the electrical industry, in its approach to the problem of electric cookery, to take a new tack, to look some facts squarely in the face, and to answer the question, "Why *not* use flame for cooking?"

Do electric ranges have their advantages in appearance? Yes, of course, but an unbiased observer will admit that fuel range manufacturers are in many cases not far behind the electric range manufacturers. Is electric cooking better cooking? We think so, but everyone knows that millions of women do a satisfactory cooking job on the fuel range. Is there an advantage in cleanliness? Yes, obviously, but if we can believe the claims of the fuel range manufacturers and the stories of many housewives, the modern fuel burner is comparatively clean and the fuel oven is also, since much of the accumulations of spilled materials are burned off. Is electric cooking cooler? Yes, but actual temperature tests in comparative kitchens using modern flame equipment and electric equipment do not indicate any extreme difference in temperature. In other words, are the twenty year old ten principles of electric cooking the real sale movers which are to keep us a step ahead of an awakened fuel industry?

The answer is that in many, many cases the American public is buying electric cooking for reasons which the electrical industry has seldom, if ever, recognized for their true value; and these reasons are: safety, healthfulness, control, investment, and the other great reason which the industry has put into words but has not used effectively, modernity.

MR. GIBSON

*Mr. Gibson is the winner of the Third Lindemann Award for 1938.*

*Mr. Gibson graduated from Rensselaer Polytechnic Institute, 1923, with a degree of Electrical Engineer. He entered the student course in the summer of that year with the Hartford Electric Light Company. He was assigned to the Commercial Department and assumed the duties of Advertising Manager. In 1936 he was made Assistant Commercial Manager.*

Safety is an intangible something which has an often unexpressed meaning to the public at large, and is tremendously important. Safety has in it the elements of carefreeness, the ease of being able to use electricity anywhere—in the parlor as well as in the kitchen and in the basement. Safety is strengthened by the effect on the subconscious minds of many millions of people of the benefits of electric light as compared to the old kerosene lamp. People do not say in so many words that they buy electric ranges because they are safe, but subconsciously they buy them because they sense they have, just as with the electric light, nothing to fear from the use of electricity in any form. Safety is a negative argument. We do not use it in our sales presentation. But it is working for us twenty-four hours every day and is one of the real advantages electric cooking possesses.

Healthfulness, as compared to the products of combustion of flame cooking, is another potent sales mover which is based upon real, hard facts. Many women have discovered and are passing the word around to their friends that to cook with electricity is to end kitchen headaches, to end much of the strain of old-time housework, and often means to end throat irritations. The housewife feels better in the electric kitchen and ends her day much less tired. Doctor Brady, the well-known doctor whose writings are syndicated, says that the reason housewives formerly needed a spring tonic was because they were shut in their kitchens all winter! Here again is a real dollars and cents advantage working to help us.

What about control? One of the inherent advantages of electricity and one which enables it many times to compete with much lower priced fuels, is the ease and the accuracy with which it may be controlled. The public is aware of the almost countless adaptations of electricity to automatic control devices. They have been educated through newspaper and magazine articles to expect startling tricks, such as the seeing eye, and the opening of a door by the human voice, and they know that even such a prosaic appliance as an oil burner depends for its automatic operation upon electricity. Yet in the field of electric cooking no one has ever effectively dramatized the romance in the control of electricity. Some half hearted attempts have been made to demonstrate that breakfast can

(*Continued on page* 464)

# PRIZES AND AWARDS

## to be administered by the

# EDISON ELECTRIC INSTITUTE

## and awarded in 1939

## Prizes to Individuals

### For Papers on Subjects Relating to the Electric Light and Power Industry

**FORBES PRIZE . . . . . *Public Relations***

A cash award of $250 donated by Mr. B. C. Forbes, Editor, Forbes Magazine, for the most meritorious paper dealing with the subject of Public Relations in the Electric Light and Power Industry.

**McGRAW PRIZE . . . . . *Engineering***

Cash prizes of $250, $150 and $100 donated by Mr. James H. McGraw, Honorary Chairman, McGraw-Hill Publishing Company, for the three most meritorious papers on any Engineering or Technical subject relating to the Electric Light and Power Industry.

**RULES AND CONDITIONS OF CONTESTS FOR ABOVE PRIZES TO INDIVIDUALS**

Any person employed by an electric light and power company is eligible to enter the competition. No person is eligible to win two years in succession the identical prize or lower prize of the same award, but is eligible for a higher prize of that award. Papers must be the original work of the author or authors, prepared exclusively for this competition. Papers may be of any length, and pen-and-ink drawings or photographs suitable for reproduction may be included. Papers should be typewritten on one side only.

The first page of the manuscript must give the following information: the name of the prize for which the paper is submitted, title of paper, name of author, name and address of employing company, title or character of position and home address. One paper may not be submitted for more than one prize.

Papers not receiving awards will, upon request, be returned to contestants after the awards have been announced at the 1939 Convention of the Institute. Prize winning papers will be available for inspection at the general offices of the Institute.

***Papers for above prizes must be forwarded, in duplicate, by March 1, 1939***

## Awards to Individuals

### For Accomplishments or Acts as Specified

**THE R. B. MARSHALL AWARD . . . . . *Electric Ranges***

A cash award of $500, divided into five equal parts of $100 each for utility representatives who sell, lease or rent during the calendar year 1938 the greatest number of individual domestic electric ranges of a rated capacity of seven kilowatts or more.

The purpose of this award is to promote greater activity and efficiency among utility retail

**CLAUDE L. MATTHEWS AWARDS . . . . . *For Valor***

For acts of devotion to duty wherein extraordinary courage has been exercised in efforts to

A cash award of $500, divided into five equal parts of $100 each for utility representatives who sell, lease or rent during the calendar year 1938 the greatest number of individual domestic electric ranges of a rated capacity of seven kilowatts or more.

The purpose of this award is to promote greater activity and efficiency among utility retail

### CLAUDE L. MATTHEWS AWARDS . . . . . *For Valor*

**For acts of devotion to duty wherein extraordinay courage has been exercised in efforts to maintain important electric service or to restore service in the shortest possible time.**

Three cash awards each of $150 are offered for the calendar year 1938 by Mr. Claude L. Matthews, Vice President, W. N. Matthews Corporation, to the individuals selected on the basis of evidence submitted, as being most entitled to the awards. A citation and an appropriate button or pin will accompany each cash award.

Recommendation for the award must be submitted by the President or acting executive head of the company in which the person recommended is or was employed. All recommendations for the year 1938 must be forwarded to the secretary of the Edison Electric Institute not later than *March 1, 1939*. It is urged that a recommendation for the valor award be submitted as soon as convenient after the occurrence of the act of valor.

***Statements substantiating entries for above awards must be forwarded, in duplicate, by March 1, 1939***

*Complete details concerning the two above awards should be secured from the Secretary, Edison Electric Institute, 420 Lexington Ave., New York, N. Y.*

# Awards to Companies and Individuals

## For Accomplishments in Specified Activities

### CHARLES A. COFFIN AWARD

***Sponsored by the General Electric Company***

A Gold Medal, known as the Charles A. Coffin Medal will be awarded for the year 1938 to the public utility operating company, within the United States, which has achieved the greatest advancement in its operations and physical plant, thereby making a distinguished contribution to the development of electric light and power for the convenience of the public and the benefit of the industry. The company awarded the medal will also receive $1,000 for its employes' benefit or similar fund.

### AUGUSTUS D. CURTIS AWARD

***Lighting of Buildings***

A certificate donated by Messrs. Darwin Curtis and Kenneth Curtis, of Curtis Lighting, Incorporated, in memory of Augustus D. Curtis, to the public utility operating company within the United States which, during the twelve month period ending March 1, 1939, has shown the greatest contribution to the advancement of Artificial Illumination of interiors or exteriors of Commercial and Public Buildings, and a cash prize of $300 to the individual or individuals in that company responsible for the achievement. A second prize of $200 and a third prize of $100 to the individual or individuals responsible for the achievement of the companies adjudged second and third in the contest.

### GEORGE A. HUGHES AWARD

***Domestic Electric Cookery Load***

A trophy donated by Mr. George A. Hughes, President, Edison General Electric Appliance Company, Inc., to the public utility operating company within the United States which, during the year 1938, has shown the greatest contribution to the development of the Domestic Electric Cookery Load through promotion, or selling, or both, and cash prizes totaling $1,000 to the individuals responsible for the achievement.

### THOMAS W. MARTIN AWARD

***Rural Electrification***

A bronze plaque donated by Mr. Thomas W. Martin, President, Alabama Power Company, to the public utility operating company within the United States which, during the year 1938, has shown the greatest contribution to the advancement of Rural Electrification-Agricultural advancement within the company's territory due to uses of electricity, development of rural load, cooperation with other agencies, extension of rural lines, organization and plan for conducting rural electric development.

***Presentations of accomplishments must be forwarded by April 1, 1939***

*IMPORTANT—Complete details for the Charles A. Coffin Award, the Augustus D. Curtis Award, the George A. Hughes Award, and the Thomas W. Martin Award should be secured from the Secretary, Edison Electric Institute, 420 Lexington Avenue, New York, N. Y. Elaborate and costly exhibits are unnecessary. The merit of the enterprise presented in papers or exhibits will be the prime factor in determining awards, without regard to the size of competing companies.*

**Papers and Exhibits for 1939 prizes should be addressed to the Secretary, Edison Electric Institute, 420 Lexington Avenue, New York, N. Y. Winners will be announced and prizes awarded at the 1939 Convention of the Edison Electric Institute**

**PRIZE AWARDS COMMITTEE: Charles W. Kellogg, James E. Davidson, H. P. Liversidge, *Chairman*, Lewis B. Beatty, *Secretary***

# Electric Service and Lighting Arrangements for the Golden Gate Exposition

THE interest of utility companies in lighting arrangements and lighting intensities is so keen that the following information received from Mr. R. E. Fisher, Commercial Vice-President, Pacific Gas & Electric Company, concerning the Golden Gate Exposition of 1939 is particularly timely.

"Plans are now practically complete," states Mr. Fisher, "for the general arrangement of inside and outside lighting, according to H. P. Day, Director of Works for the Exposition. The Exposition authorities will purchase and install all general lighting for the Administration Building, the Typical Palaces, the Transportation Building, the Ferry Station, all warehouses and all public places required for administration and operation of the Exposition.

"Quite generally, the interior of the twelve Typical Palaces which have been constructed of wood framing, due to their enormous size and height of trusses, will be lighted by means of high-bay type aluminum reflectors. In some locations there will be a small proportion of uplight to provide just the right amount of shadow and relief.

"The Palace of Electricity and Communications, which is 200 feet wide by 400 feet long and similar in design and size to other Palaces, will be lighted by 1,700 lineal feet of 36 inch indirect reflector strip which will be suspended directly under the arches.

"The Art Palace, which is 275 feet by 350 feet will contain approximately 7,000 lineal feet of lens-type reflector strip to light approximately $20,000,000 worth of pictures and objects of art which will be housed in the 57 separate rooms of this structure.

"A committee of 26 lighting men, selected locally from various branches of the industry, submit recommendations and otherwise work harmoniously with Exposition officials in the development and installation of lighting effects.

"In addition to the general lighting level of the order of 12 foot-candles which is to be provided by Exposition authorities, the exhibitors are planning extensive installations of light in Palace structures and in separate buildings which will be built by the exhibitors for housing their own displays. According to word received from Exposition authorities, exhibitors will be required to provide extra light for their exhibit spaces up to approximately 5 watts per square foot in addition to the basic lighting of 12 foot-candles provided by the Exposition authorities.

"The exterior walls of Typical Palaces will be lighted in pastel color effects by the use of fluorescent tubes. A minimum number of suitable colors have been selected for each court or area. Portals to the "Court of Honor" and to the "Court of the Pacific" will be similarly lighted except that in some locations flood lighting will be employed. Main entrances to buildings, large archways and similar portals will be lighted by colored flood lighting set in niches and set-backs. Several separately designated courts will be lighted by combinations of flood lighting, spot lighting and lanterns. Trees and shrubs in these courts will be lighted directly and in silhouettes against brightly colored backgrounds. Fountains will be lighted by underwater fixtures and by means of changeable colored lighting projectors.

"More than 10,000 trees, more than 100,000 shrubs and approximately 70,000 bulbs and flowers will be transplanted or grown on the Exposition site. This $1,500,000 horticultural transplantation is now about one-half completed. So far as horticulture is concerned, the man-made, hand-made island will be altogether typical of the Great West in its tropical aspects.

"The 1915 San Francisco Golden Gate International Exposition established the first 'yardstick' for Exposition lighting and beauty. That outstanding job was installed under the direct supervision of Mr. D'Arcy Ryan and his corps of capable assistants. That same group of assistants have "followed the Fairs" since 1916. They admit that their latest and very best experience has been allowed a free hand to make San Francisco's 1939 Exposition 'A Veritable Island, Floating on a Sea of Light.'

"All drives and lanes will be lighted by very unique and special types of pendant lanterns. The causeway connection around Yerba Buena Island, which connects with the San Francisco-Oakland Bay Bridge, will be lighted by sodium luminaires mounted on steel standards. Parking areas will be lighted by large enclosed types of flood lighting, supported on high steel towers.

"A unique and unusual scintillator effect will be established on an elevated location across the lagoon to the south of Treasure Island. At this location a total of twenty-four 36-inch searchlights with color screens will be in operation. Converters, regulating equipment and operators will be housed in a suitable structure at this location.

"At this writing it appears that outdoor lighting will total about 6,000 kilowatts and indoor lighting plus power will total about 10,000 kilowatts of demand. Approximately 6,000 flood lighting units will be in operation.

"Electrical service for lighting and power on Exposition Island will be supplied by the Pacific Gas and Electric Company. The supply will originate at generating stations in Oakland and in San Francisco. Service will be supplied to the Island through two 500,000 cm and one 250,000 cm, rubber insulated, submarine-type cables conducting electricity at approximately 11,500 volts three-phase 60-cycle to a metering point located on the Island. These cables will supply approximately 30,000 kv-a capacity. The demand was originally estimated to be of the order of 15,000 kilowatts. To supply this demand the utility is preparing to install a total of four 4,000 kv-a step-down transformers with automatic tap changing devices. At this time there is possibility this demand limit will be stepped up approximately 5,000 kilowatts. Original estimates made a year ago indicated that approximately 48,000,000 kilowatt-hours would be consumed on the Island during the open days of the Exposition but it now appears that this total will be materially increased. In addition to this estimated total, all the construction work on the Island has been carried on electrically. After the Exposition has closed, only three structures will remain permanently. The Island will then be devoted to aviation."

# Network Supply when Intermeshed from Both Generating Stations and Substations

By T. Maxwell

*Consolidated Edison Company of New York, Inc., N. Y.*

A paper presented at a meeting of the Transmission and Distribution Committee, E.E.I., Old Point Comfort, Va., Oct. 11, 1938

IN the low voltage AC network system with a number of network transformers feeding into a common secondary grid, circulating currents may be produced by differences in the magnitude and phase angle of the primary feeder voltages. Such circulating currents tend seriously to limit the safe loading of net work transformers and to cause operating difficulties such as the failure of network protectors to remain closed. Primary voltage and angle differences generally arise from the following causes:

(1) Voltage and phase angle differences between the busses in a generating station supplying the network.

(2) Voltage and phase angle differences between generating stations when the network is supplied from more than one station.

(3) Differences in the impedance characteristics of the various primary circuits supplying the network.

The manner in which the AC networks of the Consolidated Edison Company, Inc., have been planned and designed to take care of the first two causes of voltage and phase angle differences has already been discussed.* The third cause of voltage and phase angle difference (the difference in impedance of primary circuits) and the method which was adopted to alleviate the condition will be described herein.

The network transformers in the initial AC network system in Manhattan were fed from existing distribution substations at a primary voltage of 3 kv. With the increase in the area and load supplied from the AC network system, it became desirable and economical to supply additional transformers at 13.2 kv direct from the generating stations. The first 13.2 kv network transformers were 10 per cent impedance units and external iron core reactors were used where necessary to insure proper paralleling of the units on the network. However, because of high tension customer loads, the generating station bus voltage could not be varied through a sufficiently wide range to give constant network voltage over a 24-hour period with units of such high impedance, although induction regulators at the 3 kv substations provided a means of keeping the network voltage of the 3 kv units constant.

As soon as it became apparent that the growth of the network system would result in the 13.2 kv transformers becoming the principal source, the use of 10 per cent transformers was discontinued in favor of 5 per cent and later 4 per cent impedance units. The use of the lower impedance 13.2 kv transformers facilitated maintaining good network voltage by varying the generating station bus voltages over a 2 to 3 per cent range on a schedule determined by the amount of the system load and the time of day but increased the problem of circulating currents, particularly at multi-bank installations where there was little or no impedance in the secondary connections between transformers.

Figure 1 shows schematically a small section of a typical network supplied partly by 13.2 kv feeders from a generating station and partly by 3 kv feeders from a substation deriving its supply from the same generating station. The impedance of the substation transformers is approximately 10 per cent while the 13.2 kv network transformers have 4 per cent and 5 per cent impedance and the 3 kv network transformers 2½ per cent on rating. It can readily be seen that the impedance of the 3 kv path is considerably greater than that of the direct 13.2 kv feeders. The 3 kv induction regulators at the substations were used to compensate for the greater voltage drop in the path by way of the substation but, as normally connected, were unable to correct for the lag in phase angle introduced by the substation transformers.

The angular lag of the 3 kv network transformer voltages resulted in notably poor power factor on the 3 kv system and failure of many of the network protectors on the 3 kv network transformers to close even when the network voltage in the vicinity was definitely below the transformer voltage. In instances where the protectors of the 3 kv transformers remained closed, these units tended to shirk load, forcing adjacent 13.2 kv units to carry excessive load.

Test readings of current, voltage and power at one 3 kv substation and on the transformers in a small typical section of the network indicated a substation power factor ranging from 30 per cent to 66 per cent over a 24-hour period as compared with a network load power factor of from 80 per cent to 90 per cent.

Each 3 kv feeder has two mechanically-coupled, single-phase induction regulators at the substation originally connected for automatic in-phase regulation. By reconnecting the exciting windings to different phases without changing the connections of the series windings it was possible to obtain a phase angle shift either toward the lead or toward the lag together with a voltage boost and at the same time to maintain a balanced voltage triangle. Calculations as well as tests made on a small section of the network indicated that the connection which would give a simultaneous voltage boost and leading angle would be most satisfactory for the correction of the network transformer load unbalance and would materially improve the substation power factor. This connection is shown in Figure 2 which also shows a vector diagram of voltages. It will be noted that, in effect, the regulators boost the voltage at a 60 degree angle rather than in phase and that a balanced triangle of voltages is maintained provided both regulators boost by the same amount.

It was found by test that with the level of 3 kv bus voltage previously existing, the regulators could not be operated to give the desired phase angle without producing high voltage at the

* "Planning a Distribution System" by J. F. Fairman. *The Electric Journal*, June, 1938

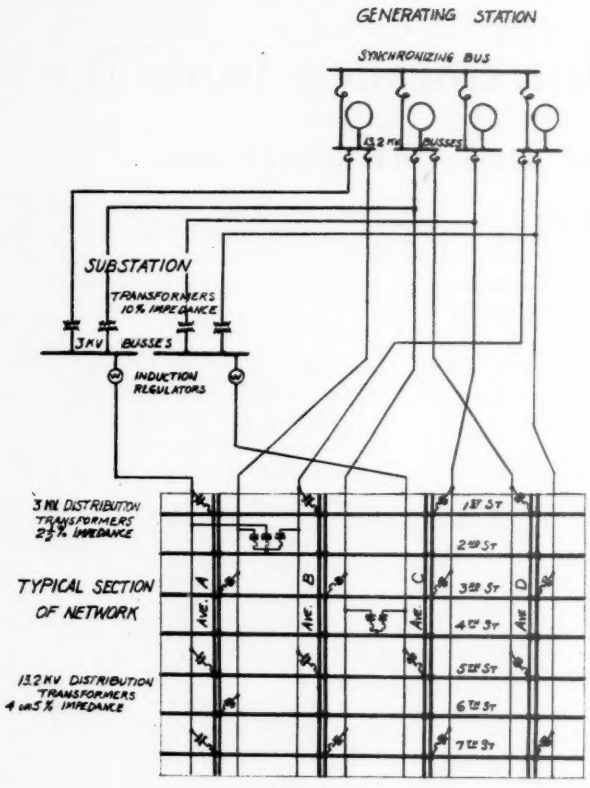


*Fig. 1*

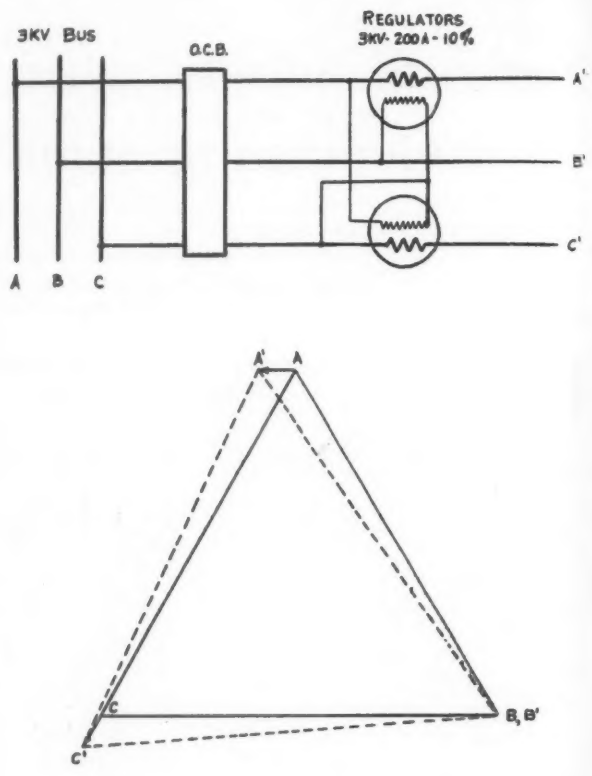


*Fig. 2*

network transformers. This condition was corrected by changing the substation transformer taps to give a lower 3 kv bus voltage.

The regulators were placed on manual control and a schedule of daily operation was determined for each 3 kv circuit. In general the regulators for each circuit are operated in a fixed boost position throughout the 24 hours. In one area a two-step schedule has been adopted reducing the boost for a short interval (5 p.m. to 10 p.m.) to avoid overvoltage in the network in lower Manhattan during the evening after the load in the area has diminished.

The method of regulation described has proved entirely satisfactory and has made possible very much more effective utilization of the original investment in the 3 kv system.

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## "Is Electric Cookery Really Better?"

(*Continued from page* 430)

ery is clean and fast. You may have to prove that last word *fast*. Well, if you need to, then do this: Put six potatoes in a flat-bottomed, closely-covered kettle, add one cup of water and then put the kettle on one of the surface units on your electric range; turn the switch to 'high;' mark down the time on a paper. When the steam comes out from under the lid, turn the switch to 'low.' Within 25 to 30 minutes from the time you started the test the potatoes will be done.

"Then, next time you are at your niece's home, cook the potatoes her way on her range. Unless you stand near the range and watch the kettle closely, you will have to cover the potatoes with water. The time required to bring this amount of water to boil, you will probably find, is greater than that to bring the one cupful to boil on the electric unit. From this point on, both speeds will be the same because after a vegetable has been brought to the boiling point it will cook only so fast, regardless of the amount of heat applied to the bottom of the kettle. This test will prove to both of you that electricity is fast. If you need any further proof to convince your niece, just show her how you can bake biscuits in ten minutes from a *cold* start.

"You probably won't need to tell her about the cleanliness of electric cookery; but if you'd like to, then tell her of the experience you will have when you start using your new electric range. This is what you can do:

"Clean and polish the outsides of your pots and kettles the day your electric range is installed. Those utensils will stay that way from then on. Roast your meats in an open pan, not too much larger than the size of the meat, and use the lower roasting temperatures of the newer cooking instructions, and the inside of your oven, too, will stay like new.

"What woman could keep from being interested in an electric range if you tell her how well you know that electric cookery is fast, clean and that it saves time and money?"

# A New Semi-Underground System for Benton Harbor, Michigan

By Robert E. Morse

*American Gas and Electric Service Corp.*

A paper presented at a meeting of the Transmission and Distribution Committee, E.E.I., Old Point Comfort, Va., Oct. 11, 1938

BENTON HARBOR, MICHIGAN is situated on the shores of Lake Michigan about 60 miles directly across the lake from Chicago. It is the center of a large farming and fruit raising community and is the primary market for a great deal of produce. There are also several large industrial establishments within the urban area which also includes the city of St. Joseph across the St. Joseph River at its outlet into the lake. This area also does a large resort business in the summer which adds appreciably to the population during those months.

The permanent population of the city of Benton Harbor alone is approximately 15,000 and there is at least an equal additional population within a 10-mile belt around the city. Two important U. S. Highways pass through the city. One of these, U. S. No. 12, is one of the main routes between Detroit and Chicago and the other, U. S. No. 31, the Dixie Highway, running north and south. Both of these highways use the main street (Main Street) of this city throughout most of its length as it provides the only means within several miles of crossing the marshes at the outlet of the St. Joseph River and the river itself west of the city and also a ravine a few blocks east of the business center. Through traffic added to the heavy normal traffic resulting from local activities has created exceptionally heavy congestion in this street and the State Highway Commission has therefore decided to widen this street as much as possible in order to facilitate the movement of traffic through it.

The principal source of electric energy for the entire urban area, including both cities and many of the industries, is from a substation located on Main Street west of the business district of Benton Harbor at the edge of the marshes and about half way between the center of the city and the river. A photograph of Main Street looking west from a point about two blocks east of the center of the city as it existed prior to any reconstruction is given in Fig. 1. The pole line carrying primary and street lighting circuits is shown on the south side of the street. The street widening project proposes to cut 5 ft. from the sidewalk for nearly a mile east from the Main Street substation on each side of the street which will leave this pole line out in the street and it has therefore become necessary to remove it as there will be insufficient room in the sidewalk through the congested part of the city for a new pole line. Fig. 2 is a map showing the physical layout of the central part of the city and the location of overhead primary feeders before reconstruction was started.

When the first warnings of the proposed widening project were heard, a thorough survey of the entire situation was made with a view of determining the most feasible and economical means of solving the problem which would be created by removal of poles from Main Street. Alleys and also some other streets parallel Main Street through part of its length and were used, to a large extent, for secondary distribution and for transformers, but none of these routes is continuous. Fig. 3 shows a typical view in one of these alleys and the type of overhead construction made necessary on account of the congested condition of the alley. The feasibility of carrying primary feeders in aerial cable through these alleys was thoroughly investigated as this seemed at first glance to offer the most economical solution of the problem. A partial solution could have been worked out with this method but it would have been very expensive and would have had a very limited flexibility. The problem would not have been entirely solved by this method in any case due to the lack of continuity of all of these alleys and streets and it would have been necessary to resort to some overhead construction on Main Street which both the State and City authorities, as well as the company, desired to avoid.

Due to the fact that no other practical route is available for bringing the 4 kv feeders east from the Main Street Substation except along Main Street

*Fig. 1—Main Street, Benton Harbor, Mich., looking west.*

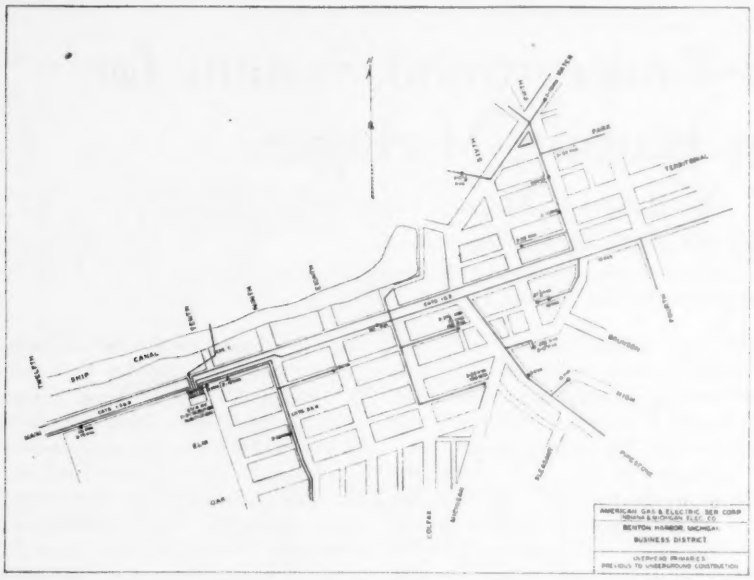


*Fig. 2*

itself, it was decided after a careful analysis of comparative costs, flexibility of design and all other factors entering into the problem, to build an underground duct line in Main Street to carry these feeders through the business district. In order to reach existing overhead lines fed from these feeders at points where terminal poles could be conveniently located, it was also necessary to include underground duct lines south in Pipestone Street and north in Sixth Street from the Main Street duct line. Fig. 4 is a map showing the business district with the duct lines which were finally constructed. Some additional duct line was also built in order to carry out the secondary system design as finally adopted, but most of it was made necessary solely to provide adequate means of bringing the 4 kv feeders through the business district.

In building these duct lines, considerable difficulty was anticipated, which was in part fulfilled, on account of subsurface conditions. This part of the city is also a few feet above the lake level. The sub-soil is entirely sand and is water bearing generally about 5 ft. below the surface. At the center of the city, fortunately, where most of the construction took place, the water table was considerably below this and did not interfere with construction. In certain parts of the area this bed of sand had an overlay of peat. At one of these locations there had evidently been a foundry or blacksmith's shop at some early period in the city's history and it was necessary to cut with an acetylene torch through a layer of scrap iron some 3 in. or more thick to open the ditch to the required depth. Considerable excitement was caused at one time during this cutting when the peat bed caught fire and heroic measures had to be taken to extinguish it before the fire got well started. At another location east of the central part of the city, springs were encountered in the bottom of the excavation which took two 3 in. pumps working continuously to hold the water down until the concrete could be placed and set. At one time Benton Harbor had a street railway system and when it was abandoned several years ago new street paving was merely placed on top of the rails, which had to be cut through with a torch wherever it interefered with this construction. In addition the usual obstructions were encountered forcing ditch depths up to 10 ft. in spots.

So far, nothing has been said about the secondary distribution within this area since the necessity for building the underground duct lines was entirely due to the necessity for providing feasible routes for primary circuits when the Main Street pole line was removed. It

*Fig. 3—Typical alley, Benton Harbor, Mich.*

was apparent from the moment that the preliminary investigations started, however, that a complete redesign of the secondary distribution system was desirable and could be effected at a very moderate cost. This area has a great deal of small power which was served from 220 volt, three phase mains paralleling the 220 volt, single phase, three wire lighting mains practically throughout the entire area and it was immediately apparent that a very great simplification of the secondary distribution could be made by the establishment of a three phase, four wire "Y" secondary system. There has been an increasing tendency on the part of this company to provide three phase four wire "Y" secondary service in congested areas for several years past with most satisfactory operating results which suggested its use in the present instance. Further detailed investigation of the area disclosed the fact that there were very few services which would require anything but a nominal amount of work to accommodate them to the proposed mains. This, of course, also suggested the establishment of a three phase four wire secondary network system but the load density did not justify the investment in the necessary network protectors. A compromise was therefore worked out which will be described in more detail later on in this paper, which it is believed will assure most of the benefits of a conventional ac network system to this area without the expense of installing and maintaining secondary network protectors. Provision has been made for them, however, in all permanent structures so that they can be installed at any time that the load conditions warrant.

Having decided on the installation of a three phase, four wire "Y" system, full advantage was taken of the possibility presented of installing a few large size transformer banks to replace the many small banks and individual transformers now serving the area. Five underground transformer vaults were located at strategic points from which it is possible to feed most of the area. Besides these, one bank was located on an existing platform and the balance of the area served by small three phase overhead stack type units located at points too far away to be reached by the proposed secondary mains.

Four years ago, this company installed a semi-underground system in Elkhart, Ind. The system installed at that time was a conventional straight ac secondary network in which all of the transformer banks were located in underground vaults and protected with network protectors. The business district of the city of Elkhart where this semi-underground system is installed is provided with alleys in a north-south direction between the streets parallel to the main street, but no alleys in an east-west direction. All buildings on Main Street and streets parallel to it were, and still are, served from overhead secondary mains in these alleys. The blocks on the cross streets are so short betweeen the alleys and the north-south streets that it is also possible to serve all buildings located on the cross streets from these alleys. At the time the network was installed, underground ducts were built in the cross streets and underground secondary ties installed in these ducts, but the secondary mains themselves were brought up risers within the alleys and carried overhead in the alleys from cross street to cross street where they again entered risers and dropped down into the underground system to tie in with the cross ties. In this way there were no overhead wires on any of the streets in the business district, as all crossing of streets by the secondary mains was done in underground ducts. The primary system in the business district of Elkhart is entirely underground. At the time this system was installed it was found that open wire secondaries for the overhead portion of the secondary mains would have altogether too high a reactance to form adequate secondary ties for a network system and it was therefore decided to use three insulated cables grouped together in a single hanger for this purpose in order to bring this reactance down to reasonable limits. Using a hard drawn stranded copper cable of suitable size it was found perfectly feasible to suspend three 500,000 c.m. insulated cables from a hard drawn copper messenger which at the same time served as the common neutral conductor of the entire system. A scheme was worked out for tapping services from these mains at supporting poles located within the alley and thus it was possible to install this system with all of the advantages of an underground system without the expense of building duct lines in one direction to carry the secondary mains and also avoiding the expense of installing underground services.

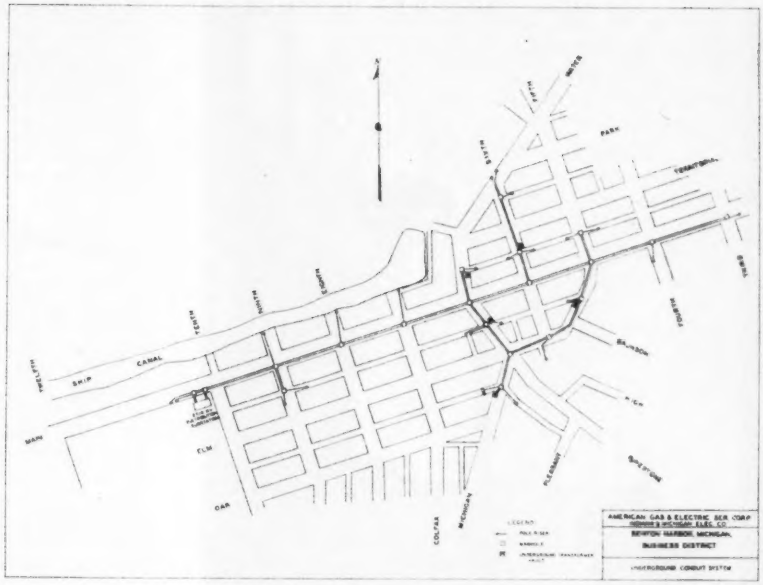


*Fig. 4*

Several photographs of the Elkhart overhead network secondary are shown in Figs. 5, 6 and 7. Fig. 5 is a general photograph showing a typical secondary run in an alley. Fig. 6 shows the construction at a service takeoff, and Fig. 7 a closeup of the top of a riser showing the automatic dead-end used for dead-ending the messenger and the method of dead-ending the aerial cable. This view also shows a service bus tap-off from the overhead mains.

The type of construction used in Elkhart provided such a pleasing appearance and proved so satisfactory to the Municipal Authorities in reducing congestion and fire fighting hazard in these alleys that the same type of construction was adopted for use in Benton Harbor

*Fig. 5—Typical alley, Elkhart, Ind.*

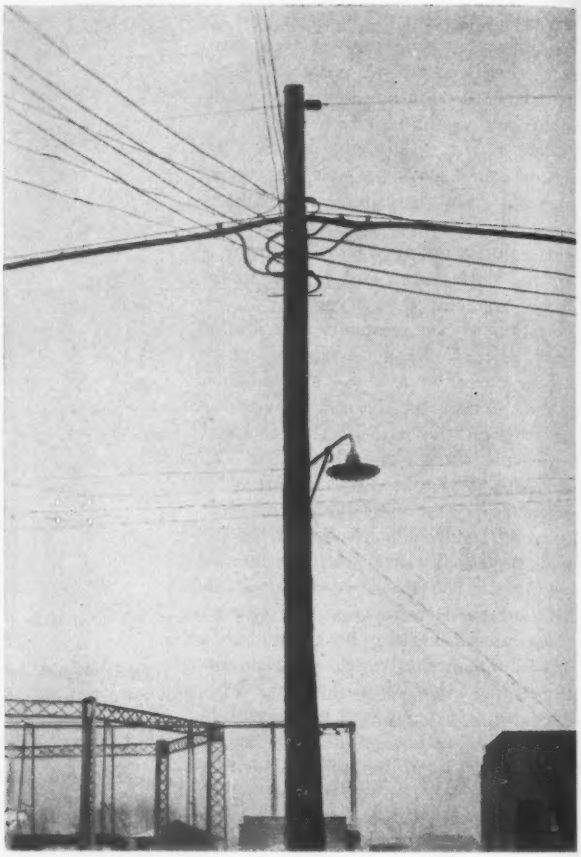

*Fig. 6—Service rack, Elkhart, Ind.*

where the present alley congestion, due to structures other than those belonging to the Power Company is worse than it was at Elkhart. It is expected that a still more pleasing appearance will be made through the use of service cable for service drops instead of open wire.

Figs. 8 and 9 show the Benton Harbor system as finally laid out. Fig. 8 is a map showing the arrangement of the primary feeders, and Fig. 9 a map showing the arrangement of the secondary mains. It will be noted that the area will be served through five underground transformer vaults and one overhead platform. In addition to these, there will be five installations of small stack type, three phase units, each serving a small area of its own. The entire area will be served from two 4 kv feeders and the various transformer installations staggered between them in such a way that adjacent banks are on opposite feeders. The five underground vaults will be banked together through a system of secondary mains in order to overcome the tendency for voltage flicker due to motor starting, etc. The ties are not intended to carry any great amount of load but each bank will be expected to carry its own load as in a radial system. In order to limit the current that may be carried through these ties, fuse links will be installed in the secondary mains at the mid points between banks. These fuse links will be designed to open the circuit at slightly in excess of the normal carrying capacity of the cable form-

***Fig. 7—Secondary riser pole, Elkhart, Ind.***

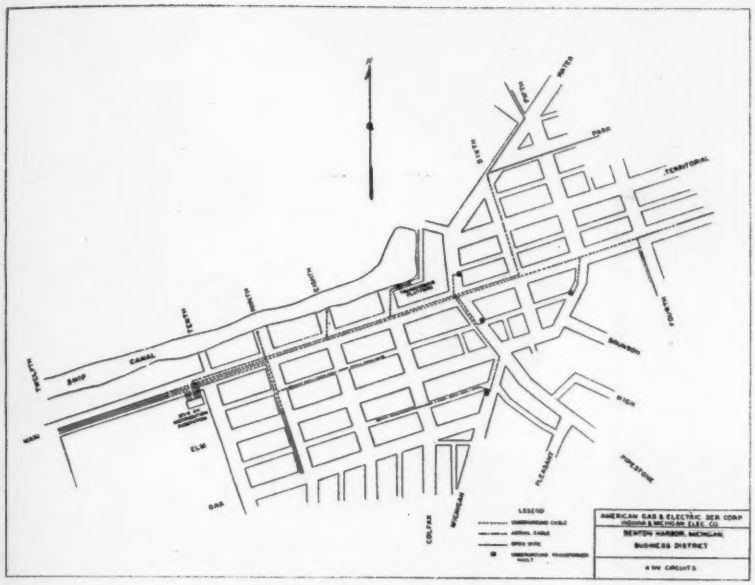


*Fig. 8*

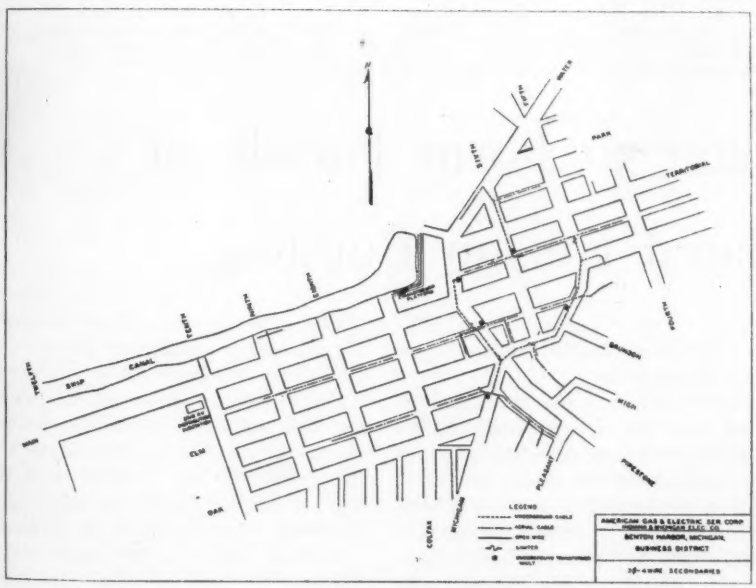


*Fig. 9*

ing the tie amounting to about one-third of the capacity of each of the banks. These fuse links are intended to isolate either a single bank or group of banks on one of the two feeders in case of primary or secondary short circuit before serious damage can be done to that part of the system which is not in trouble. Short circuit studies have been made of the entire system included within the area, in order to coordinate these fuse links with the primary fuses on the primary side of each bank and the substation breakers. These studies also included the overhead distribution which is picked up at the ends of the underground system so that the line fuses placed at these points could be coordinated to disconnect any overhead tap that is in trouble before the feeder breaker has a chance to open.

A feature of this installation is that no lead covered cable whatever will be used in any underground ducts for either primary, secondary or series street lighting service. This company has made increasing use of non-leaded cable in underground ducts at voltages up to 13.2 kv and dating back for over 10 years with very satisfactory operating results. From the experience gained with these installations, together with several unhappy results of lead sheath corrosion it was decided to make this installation a 100 per cent non-leaded job. It is believed this will be of particular advantage in Benton Harbor, as the ducts will be submerged much of the time and it is believed that lead sheath would be subject to considerable chemical corrosion. The use of non-leaded cable will save considerable money in the cost of installation and will be much simpler to maintain.

The system has been designed so that it can be expanded as load increases with very little additional expense. Provision has been made for network protectors whenever the load rises to a point where they are justified. In the meantime, it is expected that this area will enjoy practically all of the benefits of a conventional underground ac network system, at a fraction of the cost necessary to install such a system with network protectors, underground services and all the appurtenances that go with it.

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## J. P. Pulliam Honored At Testimonial Dinner

FIFTY years of service to the public is the record established this month by John P. Pulliam, president of the Wisconsin Public Service Corporation.

In celebration of the event, associates from the Wisconsin Public Service Corporation tendered Mr. Pulliam a testimonial dinner at Oshkosh, Saturday evening, Oct. 8. At the dinner Mr. Pulliam was presented with a leather bound volume containing a message signed by approximately 1500 employees of the Corporation, resolutions from the companies with whom he is associated, messages from the American Federation of Labor union organizations, and congratulatory messages from Governor La Follette and associates and friends in the utility industry throughout the United States.

In 1932 Mr. Pulliam was elected president of the Wisconsin Public Service Corporation and the Menominee and Marinette Light & Traction Company. Since the death of Mr. Clement C. Smith in 1935 Mr. Pulliam has assumed direction and management of all the Smith enterprises. He is also chairman of the Board, Badger Paper Mills and a director of the Flambeau Paper Mills.

From a drawing by Hugh Ferris

*"Water Ballet" facade of the Exposition Building under construction for the New York World's Fair 1939 by the Consolidated Edison Company of New York, Inc., and affiliated companies. The building's entire 9,000 square foot facade will be sculptured in water by a fountain colonnade, formed by the discharge of 40,000 gallons of water an hour to a height of forty-two feet in the air. Staged in the reflecting pool which rims the structure, a water ballet climaxes the spectacle. A bridge passes through the water wall into the building, which will house the "City of Light," the world's largest diorama, a colored, lighted, animated architectural model of the New York metropolitan area.*

# Wall of Water to Form Facade of Consolidated Edison Building

A 9,000 sq. ft. wall of water, in front of which will be displayed the first water ballet ever executed, the conception of a leading sculptor, will form the exterior of the exposition building under construction at the New York World's Fair, 1939, by the Consolidated Edison Company of New York, Inc., and affiliated companies.

Together the water wall and ballet will provide a building facade said to be totally unlike anything ever produced. By day the facade will be a 42-ft. wall of crystal white water, with sunshine inducing rainbow effects in the individual fountains. By night the building wall will become an iridescent colonnade of sparkling blue waters, a sheet of light accentuated by an adjacent reflecting pool's waters, before which fountain jets will suggest the actions of ballet dancers.

Reflected in the pool will be landscape garden elements—a carpet of green grass, a yew hedge and a pair of birch trees, whose multiple trunks will be projected in shadow on the building's exterior. At one side, pylons will be seen marking the entrance to the Electrical Plaza while the great orb of the Perisphere will rise above the spectacle.

Throughout the garden setting designed for the Consolidated Edison Building, water is accentuated as an ideal medium for the display of electric lighting, the setting, as a whole, having been designed to approach the ultimate in nightlight, as well as in daylight, gardening. This purpose is in harmony with Consolidated Edison's basic objective at the exposition, the dramatization of the part played by utility services in modern life.

In effect the "water ballet" facade is a theater curtain behind which will be played the drama of the "City of Light" diorama, a colored, lighted, animated architectural model of the New York metropolitan area, nearly as long as a city block and higher than a three-story building.

Structurally the water ballet has four divisions. In the "revolving cones" section six vertical jets, varying from 20 to 45 ft. in height, turn through cone shaped paths in the manner of whirling dancers. "Oscillating plumes" are formed by two large jets of water, 100 ft. apart, pointing to one another, swaying back and forth like dancers bowing to one another. More spectacular are the "bombshell jets," which recall the leap of a ballet dancer. In this formation large masses of water are projected into the air and, with their supply source suddenly cut off, permitted to form "water bombs" which "explode" by falling back into the pool with a resounding report. In the final number a rotating "peacock tail" nozzle, in the center of the ballet area, throws a fan shaped jet 25 ft. into the air. The jet changes color as it revolves about a vertical axis. Submerged aluminum projectors, whose action is synchronized with the jets, provide lighting for the ballet spectacle.

The facade was designed by Harrison & Foilhoux, architects. Alexander Calder, sculptor, executed the water ballet. H. L. Cooper, chief hydraulic engineer, New York World's Fair, Inc., designed the mechanical equipment.

# Supply of Energy for Household Purposes in the United States

By C. W. Kellogg

*President, Edison Electric Institute, Chairman, Engineers Public Service Company, New York, N. Y.*

A paper presented before the Vienna Sectional Meeting of the World Power Conference, Vienna, Aug. 25-Sept. 2.

**In two parts—Part II**

## MARKET ANALYSIS AND CANVASSING

Electric utilities have found it desirable to make periodic surveys to obtain specific information concerning the market for and use of electric appliances. These are most often conducted in the residential field where it has been the practice for many years to promote the sale of electrical equipment.

Surveys have been conducted to determine the average number of wired outlets in homes, to determine the saturation of specific appliances—electric refrigerators, ranges, water heaters, radios, etc., to give some measure of the results obtained from a particular advertising or other sales program, to ascertain whether certain appliances are continued in use after they have been purchased or if they are repaired or replaced when they are no longer serviceable, or to find out the desire of different classes of people for new appliances. Of particular importance have been surveys among customers belonging to the low income group or the small use customers. Surveys of household lighting with the aid of the sightmeter (Foot-Candle Meter), to demonstrate visually the intensity or lack of intensity of light, particularly in the living room and kitchen where there is greatest need for good light, have been made extensively during the past few years.

Market surveys, of course, are not confined to domestic customers. Careful surveys of commercial and industrial customers are frequently made because a knowledge of the market is so essential to successful sales effort.

Occasionally an outside agency is retained to make these market studies, but it is customary practice for the utility to obtain this information by the use of employee investigators. These may be meter readers or outside sales personnel. When customers attend cooking schools, entertainments, or other functions sponsored by the company they may be requested to fill in registration cards which give desired market information.

These market surveys have proven valuable as a means of obtaining the information upon which successful sales programs have been planned. The programs for the sale of refrigerators, for improved lighting, for the sales of electrical housewares, such as electric roasters, electric casseroles, toasters, coffee percolators, teapots, egg cookers, food mixers, etc., have been productive of good results. There has been a decided improvement in home lighting, and the program to promote the idea of the modern kitchen has materially increased the sale of electric ranges and water heaters.

The information obtained from surveys of low use customers has been particularly fruitful in helping to plan a sales effort. In many rate schedules there is established a minimum monthly bill regardless of how little electricity a customer uses. One company, after a study of its low use customers, was able to reduce the percentage of minimum bill customers from 26 per cent to 8 per cent within two years by well directed efforts to sell low cost appliances, particularly adapted to the needs and desires of the customers in this class.

### Sales Effort

The burden of sales promotion rests largely upon the supply company. General advertising does not result in increased sales of electric appliances except in the low cost articles of general public acceptance, such as lamps, flatirons, and radios. The larger current consuming appliances must be sold by outside salesmen. Many thousands of men, and in some areas women also, are engaged in this service. In the smaller communities "all-service" or "general" salesmen, selling all types of electrical appliances can produce satisfactory results, but in the large cities where volume is required best results have been obtained by highly trained specialists.

For many years the utilities in the United States engaged in direct selling of electrical equipment for the household. This was the general practice until ten or fifteen years ago, when public acceptance of some electrical appliances became widespread. As dealers in electrical appliances became financially stronger and evinced more ability to sell electrical appliances, some of the supply companies gradually relinquished their direct selling, first giving up the direct sale of the smaller appliances and later of all classes of electrical merchandise. In 1937 the total volume of business done in household appliances was $890,161,650 and only 15 per cent of this was sold directly by the supply companies. The remaining 85 per cent was sold by the electrical dealers. This is practically a reversal of the percentages sold by each group ten years ago. Nevertheless, today a large majority of electric ranges and water heaters are still sold by the supply companies.

### Installment Selling

One of the biggest factors in stimulating a large volume of sales of electrical appliances is the installment payment plan. This is primarily true of the larger current consuming appliances, and has been especially so during the introduction period before they have attained general acceptance by the public

The terms for installment payments have varied considerably over the past fifteen years. The volume of household electrical merchandise has been an important factor in business about this

length of time. Ten years ago electrical dealers considered an installment payment term of twenty-four to thirty months for an electric refrigerator as uneconomical. The electrical dealer could not find financing facilities to enable him to carry such credit. This led to a shortening of the terms of payment to eighteen months as a maximum. On items of electrical merchandise costing $25 to $100, the terms offered were limited to payments in six to twelve months.

When the United States Government entered the retail power business through the creation of the Tennessee Valley Authority, in order to make sales of equipment to the low income classes of customers, payment terms of three to four years were considered necessary, and a bureau was established, known as the Electric Home and Farm Authority, to provide credit on these terms. Shortly thereafter, another government bureau was established, the Federal Housing Administration, which included major items of electric kitchen equipment in a list of property eligible for insurance by the Federal Government, of loans by banks or other finance companies, and a five year payment period was established as the maximum limit.

This action on the part of the government forced private finance companies to liberalize their terms to dealers to make them more nearly conform to the terms offered by the government. Within the past year, however, there has been a tightening of credit on the part of private finance companies. It has been felt that deferred payments were running beyond the limit of economic safety and the problem of installment payments is receiving careful reconsideration.

It is now general practice to ask a down payment of $5 or of 10 per cent of the cost of an appliance, whichever is the larger amount, and to limit the terms of payment to thirty months. Inducements are offered if the payment period is shortened. The Federal Electric Home and Farm Authority, however, continues to offer its same terms of three years if one appliance is purchased and four years if two or more items are purchased at one time.

The importance of the installment payment is shown by the fact that approximately 80 per cent of the larger electrical appliances are purchased on the installment plan. This business has grown so large and important that the larger national banks have been attracted to this class of loan as an outlet for their funds. The supply companies that have continued to sell electrical merchandise directly to their customers sell on installment plans, but only a few companies have continued to finance the installment sales of electrical dealers, because banks and finance companies are now willing and able to supply this credit.

A few supply companies offer to their customers a rental purchase plan, designed to promote electric cooking and water heating. Under this plan such equipment may become the property of the renter in from three to five years. It therefore constitutes practically an installment payment plan. The majority of rented appliances are purchased in due course. Comparatively few remain in the rented status.

## GOVERNMENTAL ENCOURAGEMENT OF THE SUPPLY OF ENERGY FOR HOUSEHOLD PURPOSES

In the United States the privately owned electricity supply companies, which supply about 95 per cent of the electricity sold by central stations, have been developed without grants or subsidy from the government, except for franchises to place their facilities along the public streets and highways, and except for permits, in some instances, to build power dams in navigable streams or on public lands. From the very beginning these companies have raised their own capital, planned their own works and done all the pioneering in a new field of endeavor. During all this period there have been some municipalities that have built or purchased their own power supply system, but public enterprise has always generated less than 10 per cent of the total electricity supply.

During the past decade the Federal Government has itself actively entered the field of electricity supply in several localities. It has undertaken to construct at the public expense several large hydro-electric power plants which, in one instance, has been accompanied by a widespread system of publicly owned electrical transmission lines. In addition, within the past three years a new Federal agency, the Rural Electrification Administration, has been created to foster the construction of lines to serve rural areas, and in the past few years, also there has been created the Electric Home and Farm Authority to finance installment sales of electrical appliances and the created Federal Housing Authority has provided credit for the purchase of electrical equipment.

The first of these large scale Federal power undertakings was the Boulder Dam project, located in one of the lower gorges of the Colorado River on the boundary line between the states of Arizona and Nevada. In this case the Federal Government sells falling water at the dam to the public and private enterprises which actually generate the electricity and transmit it to the market. The Federal Government is now building other large dams at some of which power will be generated directly by the Government.

### Tennessee Valley Authority

The Tennessee Valley Authority, which was authorized by Act of Congress on May 18, 1933, among other things, was charged with:

"Development of the power resources of the Tennessee Valley watershed as an integrated system."

"Utilization of the power resources of the Tennessee Valley as a yardstick in determining the relative costs of public and private power operation; distribution of this power to the greatest number of people at the lowest possible price, and conservation of its national defense assets."

"The development embraces more than 40,000 square miles (104,000 $km^2$) and encompasses the drainage area of the Tennessee River and its tributaries in Tennessee and portions of six other states—Virginia, North Carolina, Georgia, Alabama, Mississippi, and Kentucky. More than 2,000,000 people live within this area, with about 6,000,000 in the immediate sphere of influence."

"Power bought from the Tennessee Valley Authority by municipalities is distributed by them through their own operating systems organzied under state laws. Power bought by rural cooperatives is similarly distributed. The methods employed have included the construction and operation of lines (1) by municipal electric systems, tapping surrounding rural territory; (2) by cooperative electric power associations; (3) by the Authority itself."[1])

The Tennessee Valley Authority during the fiscal year ended June 30, 1937, had a total installed capacity of 348,000 kw, sold 787,000,000 kwhr, and reported a revenue of $1,654,025.

### Rural Electrification Administration

In May, 1935, the Federal Rural Electrification Administration was established by Act of Congress to finance

[1]) Information Booklet of the Tennessee Valley Authority, 1935.

the construction of electric distribution systems in rural territory.

"Primarily the REA makes loans to build distribution lines to take electricity to farmers who are able to pay for service but have been left without it. Twenty-year loans are made at 2.88 per cent interest chiefly to farmers' cooperatives, but also to public power districts, private utilities and other agencies, for the entire cost of building electric distribution lines. The lines bring energy to the farms from the nearest source, usually a private utility or a municipal generating plant or transmission line. Additional loans, where they are needed, help to finance the wiring of the farmsteads and the installation of a plumbing system. These latter loans are on a five-year basis."

"When loans are made to cooperatives or other newly formed agencies, REA aids in perfecting an adequate organization both for construction and operation. It makes allotments for approved projects and controls the disbursement of funds from the United States Treasury. It helps borrowers to find engineers, contractors, and sources of power and its engineers review construction plans and contracts."

"After projects go into service they are assisted with their problems of management and operation."[1])

At the end of 1937 about 120 Rural Electrification Administration financed projects were in operation and 165 more were under construction. A total of 53,063 miles (85,378 km) of line had been constructed or were in process of construction on November 15, 1937, involving a total expenditure of $53,056,833, and expected to reach 174,407 potential customers. The program contemplates an expenditure of $410,000,000 extending over a period of ten years. No reports have been made as to the number of farms actually connected or of the sales, revenues and expenses of lines so far placed in service, but it has been estimated that approximately 50,000 farm customers were receiving service at the end of 1937. The total number of all farms receiving electric service at that time was 1,241,000, nearly all of which were served by privately owned electric supply companies.

### Taxation and Its Influence on Rates for Household Electricity

Despite the continued growth of electricity distribution, increasing tax burdens in the United States are lessening the possibility of further large rate reductions on the part of privately owned utilities.

Under the theory of utility regulation commonly accepted in the United States, rates are expected to include all legitimate costs of conducting business, and, of these costs, the item of taxation has become one of the most burdensome. During the past five years, revenues from consumers have been rising, but any increases which may have accrued to the investors through the expansion of their business and the enlargement of the demand for electricity have been swept away by the rising flood of taxes. This is illustrated by the following table:

### Relation of Taxes to Household Electric Rates

At the present rate of taxation upon the electric light and power companies, nearly six dollars a year, or 50 cents per month, are contained in the household electric consumer's annual bill for service. This increase in taxation has more than offset the slight growth in the annual payment of the average consumer.

After deduction for taxes, revenue per consumer is less than it was seven years ago, in spite of the fact that the utility companies have to furnish each consumer with 250 (or 45%) more kwhr of electricity per year. This is apparent from Table XIII.

TABLE XII—FISCAL RESULTS—PRIVATE UTILITY COMPANIES IN THE UNITED STATES
(Source: Edison Electric Institute)

| Year | Revenues from consumers | Operating income before taxes[1]) | Taxes | Operating income after taxes | Taxes are % revenues |
|---|---|---|---|---|---|
| | MILLIONS OF DOLLARS | | | | |
| 1932 | 1,719 | 933 | 205 | 728 | 11.9 |
| 1935 | 1,813 | 946 | 255 | 691 | 14.1 |
| 1936 | 1,941 | 1,008 | 286 | 722 | 14.7 |
| 1937 (est.) | 2,055 | 1,057 | 330 | 727 | 16.0 |

[1]) After the deduction of ordinary working expenses, rents, and depreciation, but before interest charges.

While State and municipal taxes on private utilities have grown steadily, the increase in Federal taxation has been much more spectacular. As pointed out by Mr. Alex Dow, President of the Detroit Edison Company: "Taxes continue to increase. Local authorities now tax our ownership of property, they tax our corporate existence, they tax our sales of electricity and they tax our payroll."

"They even tax us as a 'chain store.' Not to be outdone, Federal authorities tax our income, they tax our sales of electricity, they tax our capital stock and they tax our payroll—on two counts. Total taxes (of the Detroit Edison Co.) for 1937 were $7,703,987, as compared with $7,005,606 for 1936, a ratio of increase larger than that of gross earnings, while net earnings have actually decreased . . ."

"Expenditures of the national government continue from year to year to exceed its revenues. The national debt, therefore, increases. This is setting up against us and against all other taxpayers a contingent liability, which cannot yet be recorded on our balance sheet, but is none the less real."

In the matter of tax expense the electric utilities are in a very different position from the ordinary industrial or commercial organization, which can mark up the price of their product accordingly without resort to long negotiations with the regulatory authorities. It is apparent, however, that the stockholders cannot indefinitely continue to absorb the rising cost of government in the United States and it is highly probable that public service commissions entrusted with the regulation of tariffs may soon be ready to consider the compensation of the various utility systems for the increase of burdens wholly beyond their control.

Referring to taxes, the 1937 annual report of the New York State Public Service Commission stated that: "the fact that the amount of voluntary reductions in 1937 compares unfavorably with that in 1935 probably is due to a large extent to the effect of the 3 per cent tax on gross revenues of utility companies . . . There can be little doubt that this tax has deterred the making of voluntary reductions. It has also prevented the Commission from issu-

[1]) Annual Report of the Rural Electrification Administration 1937, page 5.

ing orders reducing electric rates and has lessened the reductions ordered in other cases."

The additional tax burdens that have been imposed upon private enterprise during the past few years constitute a serious threat to the full expansion of household use of electricity. These burdens must shortly result in stopping the practice of rate reductions which have characterized the policies of supply companies during the past several decades and the impetus for further expansion in the consumption of household electricity will have to come from intensive merchandising policies alone, without the aid of continuing further rate reductions.

TABLE XIII—HOUSEHOLD ELECTRIC SERVICE

| Year | Annual bill per consumer | Ratio taxes to revenues | Taxes concealed in consumer's annual bill | Net bill deducting taxes | Kwhr used per Year |
|---|---|---|---|---|---|
| | $ | % | $ | $ | |
| 1930 | 32.58 | 10.1 | 3.32 | 29.56 | 543 |
| 1931 | 33.18 | 10.6 | 3.53 | 29.76 | 578 |
| 1932 | 33.25 | 11.7 | 3.89 | 29.36 | 597 |
| 1933 | 32.67 | 12.9 | 4.20 | 28.36 | 595 |
| 1934[1]) | 33.07 | 15.1 | 4.99 | 28.08 | 624 |
| 1935 | 33.53 | 15.1 | 5.06 | 28.47 | 672 |
| 1936 | 33.81 | 15.7 | 5.31 | 28.50 | 727 |
| 1937[2]) | 34.81 | 17.0 | 5.92 | 28.89 | 793 |

[1]) A Federal 3% tax on domestic and retail commercial sales of electricity was imposed on the privately owned electric utilities beginning with 1934. [2]) Preliminary estimate.

Source: 1932, 1933, 1934, 1935 from Edison Electric Institute Statistical Bulletin #4, Domestic Service in 1936, 1937 from Supplement thereto; taxes in 1936, 1937 from assembly of published annual reports.

# APPENDIX I

## List of the Electrical Appliances, Devices and Conveniences for the Home—(Probably Incomplete)

Air Coolers
Air Heaters
Air Humidifiers
Air Dehumidifiers
Air Purifiers
Alarms (Burglar, Fire)
Annunciators
Apple Peelers
Ash Removers
Atomizers
Auxiliary Automobile Warmers

Basement Drainers
Bath Cabinets
Battery Chargers
Bells and Buzzers
Bottle Brush
Bread Slicers
Breast Pumps
Broilers
Brooders
Buffers

Can Openers
Carpet and Rug Washers
Carpet Sweepers
Chafing Dish
Chimes
Christmas Tree Lights
Churns
Cigar Lighters
Clippers (Hair, Hedge, Horse, Sheep)
Clothes Driers
Clothes Washers
Cocktail Shakers
Coffee Grinders
Coffee Percolators
Coffee Roasters
Coffee Urn Heaters
Combs (Hair Drying)
Coolers, Milk
Coolers, Water
Corn Poppers
CreamWhippers
Curling Irons
Curling Iron Heaters

Deodorizers
Dish Washers
Door Locks
Door Openers
Double Boilers
Drills
Dumbwaiters
Dutch Ovens

Ear Pads
Egg Beaters
Egg Boilers
Egg Coddlers
Egg Testers
Egg Timers
Electrostatic Dust Precipitators
Elevators
Exercisers
Extractors, Clothes
Extractors, Fruit Juices

Face Massagers
Fans, Cooling
Fans, Exhaust
Fans, Ventilating
Feet Warmers
Fire Extinguishers
Fire Place Heaters
Fireless Cookers
Floor Polishers
Floor Sanders
Floor Scrubbers
Floor Waxers
Flour Sifters
Fly Catchers
Food Cookers
Food Mixers
Fruit Pitters
Frying Kettles
Furnace Stokers

Garbage Grinders
Garden Tractors and Snow Plows
Gas Burner Ignition
Glass Polishers
Glue Heaters
Grills, Griddles, and Grinders

Hair Clippers
Hair Driers
Hair Singers
Hair Wavers
Hammers
Hand Driers
Health Lamps
Heaters, Immersion
Heaters, Miscellaneous
Heating Pads
Hosiery Drying Forms
Hot Beds
Hot Plates
Hot Water Bottles
House Numbers

Ice Cream Freezers
Ice Cutters
Ice Machines
Ice Shavers
Illumination, All Purposes
Incense Burners
Incubators
Indicators, Illuminous
Inhalers
Insect Electrocutors
Insecticide Sprayers
Ironing Machines
Irons — Flat
Irons — Laundry
Irons — Sad

Kettles
Kitchens — Complete
Kitchen Power Units
Knife Sharpeners

Lamps — All types
Lawn Mowers

Mangles
Massage Machines
Milk Warmers
Milking Machines
Motion Picture Machines

Necktie Pressers
Nut Pressers

Oil Burner Motors and Pilots
Ovens

Paint Sprayers
Parers and Peelers
Pasteurizers
Pea Shellers
Pencil Sharpeners
Plate Warmers
Player Pianos
Perfume Sprayers
Potato Mashers
Pumps

Radiant Heaters
Radiator Fans
Radiators, Various Types
Radio Sets and Accessories
Ranges
Razor Blade Sharpeners
Razors
Reducers
Refrigerators
Revolving Radiator Brushes
Rotary Nail Files

Sandwich Toasters
Scalp Treaters
Screw Drivers
Sewing Machines
Shaving Mirrors
Shaving Mugs
Shoe Polishers
Silk Hose Menders
Skate Grinders
Soldering Irons
Steamers
Sterilizers
Sump Pumps

Table Fountains
Table Stoves
Talking Machines
Tea Pots
Tea Wagons
Telephone
Thermostats
Toasters
Tooth Brushes and Gum Massagers
Toys, Various Kinds
Trouser Pressers

Vacuum Cleaners
Vaporizers
Vegetable Graters, Shredders, Parers
Ventilating Systems
Vibrators

Waffle Irons
Wall Cleaners
Wall Paper Removers
Warming Blankets and Pads
Warming Ovens
Washing Machines
Water Coolers
Water Heaters
Water Pipe Heaters
Water Pumps
Water Purifiers
Water Softeners
Wax Melters and Letter Sealers

# Accident Prevention Committee Meeting

**L. M. Shadgett, *Chairman***

THE tenth meeting of the Accident Prevention Committee of the Edison Electric Institute was held at the Chamberlin Hotel, Old Point Comfort, Va., on Oct. 6-7, 1938.

Owing to an unavoidable conflict between the date of this meeting and the date of the annual Congress of the National Safety Council which was held in Chicago during the week of Oct. 10, and also due to the recent severe hurricane conditions in New England which prevented some from attending, several members of the committee were unable to be present. The majority of the membership, however, was present and the full two-day meeting, discussing points of current interest and progress reports relating to subjects under study and investigation, were held.

A report was made on the collection of cause and location data for employees of the Electric Light and Power Industry. This was undertaken several years ago and revived about three years ago when data were collected on approximately 160,000 man years. The summary of these data for the years 1934 and 1935 was contained in an article by Mr. C. R. Beardsley which appeared in the January, 1937, issue of the E. E. I. BULLETIN. It had been decided that the nature of these data was such that complete coverage of all the industry's employees was not necessary to reveal the information desired. The present work is a collection of the data for 1936 and 1937. When these are summarized, they will be combined with the data for 1934 and 1935 and an overall summary made, so that more complete information on where accidents are happening and their causes will be at hand.

Considerable discussion was devoted to accident statistics and ways and means for restoring the downward trend in the frequency rate, days lost and fatalities. It was brought out that the low point in the days lost per 100 employees per year was in 1934, while the low point in the lost time accidents per 100 employees per year and the fatalities per 1000 employees per year was in 1935. The trends since these dates have been upward and various explanations were given in an effort to improve the conditions whereby the present trends can be reversed.

Plans were discussed for securing the accident statistics from the industry, so that these may be available more promptly after the close of the calendar year. During the past several years these accident statistics have been obtained through the annual statistical form sent out by the Statistical Department of the General Office. It was decided to endeavor to secure the accident statistics separately from the general form as a preliminary measure, so that the statistics for any year would be available much more promptly. The details for obtaining these statistics were taken under consideration and definite plans will be decided upon later.

The subject of rubber protective equipment which has been considered at length in previous meetings was discussed further. In a discussion of the safe working limits of the present commercial grade of rubber gloves it was pointed out that changes in distribution practices in which voltages have gradually increased, make it necessary that attention be given to the safe methods for working these higher voltage circuits while energized. The present rubber gloves which are purchased under ASTM specifications have limits which do not permit their use on many present day distribution circuits. Attention was called to the fact that live line maintenance tools are available and that these may offer a solution to this pressing problem. It was the consensus that this is a subject which requires very careful consideration and an effort must be made to reach a solution whereby it will be possible to continue to work the higher voltage distribution circuits, while energized, with no decrease in safety methods.

In discussing the subject of electric fences, attention was called to the increased vigilance that is being given to this practice by regulatory authorities. It was pointed out that practically all of the accidents that have been accredited to the electrified fence have been due to conditions which are not recognized as being safe. In many instances uninformed people have connected a 115-volt lighting circuit directly to a wire fence, either through or without a resistance in series. It is under such conditions that practically all of the electric fence accidents involving persons have occurred. It was pointed out that attention is being given to the design of controlling devices that are now on the market whereby these utilization circuits can be used in energizing electric fences in a safe manner. Reference was made to the recent orders issued by the Industrial Commission of Wisconsin, which have resulted from several hearings and conferences and an extended study on safe methods for energizing wire fences. The members of the committee recommended strongly that everything possible be done to see that those who are interested in electric fences are informed of the hazards and the present methods of energizing them which are considered safe. Reference was also made to some improvements in the design of dry batteries which can be used for energizing electric fences which show considerable promise for meeting a substantial portion of the problem in this field. It was the consensus of the committee that it should recommend the use of the battery charged fence wherever this is practicable.

Employee health was discussed briefly and reference made to the articles that have been appearing in the E. E. I. BULLETIN by surgeons and physicans on various subjects relating to this subject. It was suggested that after this series of articles has been completed they be reprinted in collected form and made available as a booklet. Definite decision was reserved on this until the next meeting.

An interesting discussion was held on the visual testing of employees which has thus far been considered under the subject of traffic hazards. It was pointed out that so much useful information has been gained relating to the eyesight of all classes of employees, regardless of whether they are required to drive company vehicles, or not, that visual testing should be applied to all groups. Extensive tests made thus far show that it is advisable to give this matter consideration in an effort to correct and improve the vision of many employees. It was made clear that efforts in this direction should be merely to point out to the individual that his eyesight may need the attention of a professional oculist who would be in a position to make more elaborate tests and prescribe the necessary remedial measure to be taken. This was considered important because so many instances have been found where an employee was unaware of defective vision which could be easily corrected.

A report was made on office hazards in which it was brought out that the greatest source of hazards to office employees continued to be falls on floors and stairways. Efforts are continuing towards finding materials and methods for surfacing floors whereby these accidents may be avoided.

A report was made on the joint work being done with the Electrical Equipment and the Transmission and Distribution Committees on principles of holdoff. This is a subject which has been under consideration for several years by the Accident Prevention Committee, and which during the past two years has been a subject of joint study by the three committees interested. It was reported that progress is being made towards reaching a set of general principles on holdoff which may be used as a basis for more specific company rules.

There was a discussion on the progress that has been made in preparing an outline for the handbook on safety for electric linemen. This has been under consideration for the past year and various sources of information are being studied with the view to submitting a definite outline for the text that will be primarily devoted to safety. It was pointed out that in view of the information obtained through the cause and location study, in which a large proportion of employee accidents are occurring to those engaged in transmission and distribution work, that the preparation of this booklet be undertaken as quickly as possible.

An interesting discussion on artificial respiration was held in which a method which has been under consideration by some of the operating companies during the past few years and which is commonly referred to as pole top resuscitation, was described. Those who have employed this method have reported favorable results, although it was thought by some that conclusive data are not yet available. The object of this method is to apply resuscitation as quickly as possible after a shock is received while on a pole and before the person shocked can be lowered to the ground. It was pointed out that the utilization of this short interval of time is of great importance and the pole top method has been employed in a number of cases where successful resuscitation followed. Several said that their companies had considered this to have sufficient merit to warrant its being added to their safety instructions and would be followed henceforth in the education of their linemen for resuscitation work. It was emphasized that this was not intended to be an alternative method to the Schafer prone pressure method of resuscitation but was primarily to make use of the time intervening between the time when the shock is received and when the Schafer method can be started.

The remainder of the meeting was given over to progress reports, routine committee matters, discussions of new business, and the relations with other organizations interested in safety and accident prevention.

No decision was reached as to the place or date of the next meeting, but an announcement will be made when a date and location can be decided upon which will meet the convenience of the committee membership.

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# Electrical Equipment Committee Meeting

**H. L. Wallau, *Chairman***

THE falling meeting of the Electrical Equipment Committee was held at Old Point Comfort, Va., Oct. 10 and 11. This meeting was coordinated with the meeting of the Transmission and Distribution Committee held at the same location on Oct. 11 and 12, and the two committees met together on Tuesday afternoon where problems of mutual interest were presented and discussed. Twenty-five members of the committee were present, and 28 visitors attended the open session of the meeting.

In accordance with the usual practice of the committee Monday morning was devoted to a closed session where problems relating to oil fires, apparatus troubles, circuit breaker rating and performance were reviewed, and experiences of the different members exchanged.

The report giving the present practice of bus protection was presented and approved by the committee. This study was made jointly with the A.I.E.E. and will form the basis of a presentation at the mid-winter convention where the report will receive further discussion and review before publication.

Mr. Silver, reporting for the Meter and Service Subcommittee, stated that Mr. A. B. Craig, of the Boston Edison Company, had succeeded Mr. A. J. Allen as chairman of the subcommittee, and that a joint meeting of this subcommittee with the A.E.I.C. Committee on Metering and Service Methods would be held in Boston on Oct. 26, 27 and 28. The editing committee on the Revision of the Handbook for Electrical Metermen is making progress, and hope to complete their voluminous task by spring. All manufacturers are now supplying both types of meter bearings, namely, ball type and jewel and pivot type. Further study is necessary to determine the best type and to standardize it. The manufacturers have succeeded in developing low cost current transformers for use with high capacity secondary metering. The subcommittee has given considerable attention to the metering of short duration loads such as those obtained from welders. The present-day meters will give accurate indication of kilowatt-hours for loads lasting more than 40 cycles. At the present time no data are available on the performance for shorter durations. Further study is being given to this problem.

Mr. Fitch presented a report giving the results to date of the study of the rehabilitation of insulating oils. Many companies have carried out oil treatment which in general has proven successful. However, there are a number of problems such as the elimination of inhibitors, and changes in the form of the oil, which require future study.

The report on rehabilitation of flood damaged equipment was presented and approved for publication. This report, in draft form, proved of great value to many companies in New England in the rehabilitation of the plants flooded in the recent tropical hurricane which visited that territory.

The paper on Station and Substation Lighting, presented by Mr. Hentz, showed the improvement which can be made in station lighting by applying the modern principles of "Better Light—Better Sight" to these plants. This paper, and the accompanying discussion, showed how eye-strain on operators, with resulting fatigue, could be eliminated with consequent improvement in operating efficiency.

A paper by Mr. Sporn, with an accompanying paper by Mr. Ralph G.

Lockett of the I.T.C. Circuit Breaker Company, described the construction, testing and application of 2300-volt air circuit breakers for station service at the Logan Plant of the American Gas and Electric Company. This was the first large application of this type of breaker to utility station service, and discussion brought out that there was considerable interest in this subject.

The paper by Mr. Conwell, on System Planning, and the accompanying discussion, showed the necessity for long term planning in order to obtain complete coordination of all the facilities of a utility so that modifications and additions to the plant could be made as required with minimum changes of existing plant. This discussion developed the necessity for making plans on the basis of system load and not on the additions at certain calendar periods.

The afternoon session on Oct. 11 was joint with the Transmission and Distribution Committee and is reported on page 462.

# Transmission and Distribution Committee Meeting

H. P. SEELYE, *Chairman*

THE fall meeting of the Transmission and Distribution Committee of the Edison Electric Institute was held at the Chamberlin Hotel, Old Point Comfort, Va., Oct. 11 and 12, 1938. The attendance at this meeting was approximately 100, which included most of the members of the committee and several invited guests and visitors.

The subject committee on Underground Methods and Accessories met throughout the day on Oct. 10 and an excellent attendance was present. This meeting was presided over by Mr. J. A. Brooks and subjects relating to cable and underground problems were discussed, in addition to a number of interesting papers being presented. Following is the program of this subject committee meeting:

Recent Network Cable Tests; a paper by J. W. Bennett, Western Massachusetts Companies.

Gas Tight Non-Porous Wipes on Lead Cable Sheathing; a paper by K. S. Wyatt, Enfield Cable Works, Ltd., England.

Impulse Dielectric Strength Tests; a paper by E. W. Davis, Simplex Wire & Cable Company.

Vertical Terminations of Paper Cable; Discussion by Insulated Power Cable Engineers Association.

Cable Operation Report for 1937; discussion by E. R. Thomas, Consolidated Edison Company of New York, Inc.

Network Operation Report for 1936 and 1937; discussion by E. W. Oesterreich, Duquesne Light Company.

There was a meeting of the subject committee on Distribution Economics during the afternoon of Oct. 10, at which the Field Testing of Loads on Distribution Transformers was the main subject of discussion. This meeting was presided over by Mr. F. E. Sanford.

A group meeting of the chairmen of the various groups of the Transmission and Distribution Committee was held at dinner on the evening of Oct. 10.

A part of the first session of the regular meeting was under the sponsorship of the Underground Group, of which Mr. C. W. Franklin is chairman. A paper prepared by Mr. T. Maxwell, Consolidated Edison Company of New York, Inc., was presented by Mr. J. A. Brooks. This was on the subject of "Network Supply when Intermeshed from Generating Stations and Substations."* Mr. R. E. Morse of the American Gas & Electric Company, presented a paper on the subject "Semi-Underground Distribution System for Benton Harbor, Mich."* The discussion included the Evansville Semi-Underground System on which a paper was presented at the May meeting by Mr. E. V. Sayles, inasmuch as no opportunity had been given for its discussion at the time it was presented at the May meeting. Abstracts were given of the Cable Operation Report and the Network Operation Report which had been discussed by Mr. E. R. Thomas and Mr. E. W. Oesterreich, respectively, at the meeting of the subject committee on Underground Methods and Accessories, held on the preceding day.

It was explained that these two reports require a tremendous amount of work and effort in collecting the necessary data and compiling into form for these reports. Those who have borne the major part of this work were anxious to learn whether or not the two reports are used sufficiently by the industry to warrant their being continued in their present form. Following a discussion of this matter it was decided to defer final action until the next meeting.

The remainder of this session was devoted to reports on subjects under consideration by the Standards and Specifications Group, E. V. Sayles, chairman.

Mr. A. E. Silver and Mr. H. F. McRell each presented a report on the work that is being done by a Joint Committee of E.E.I. and NEMA along the line of standardization of distribution transformers. It was brought out in these discussions that at the present time a large variety of small distribution transformers are being called for by purchasers which makes it impossible to carry many of them in stock. An effort is therefore being made to reduce this number of styles and varieties of transformers of the lower sizes which are mainly for use on rural distribution lines in order that more prompt deliveries can be made and with some expected lowering in cost. The joint committee has taken for its first assignment a study of transformers not in excess of 25 kva in size and voltages not in excess of 15 kv. Later, when this group of transformers has been standardized to the satisfaction of those concerned, it is probable that additional standardization work will be studied in an effort to simplify the situation with regard to transformers of other sizes and voltages.

Mr. Sayles made reports on other activities which have been undertaken as follows: Line Hardware; Wood Crossarms; Insulators; Insulator Pins and Threads; Conductor Sags and Tensions.

The afternoon session Oct. 11 was held jointly with the Electrical Equipment Committee, and is reported on the next page.

The morning session for Oct. 12 was taken up mainly by the Overhead Distribution Group with Mr. W. F. Nimmo, chairman, presiding. In this session the following papers and reports were presented.

Mr. F. W. Packer, Pennsylvania Power & Light Company, presented considerable cost data regarding the various methods of treating standing poles. Experience which had been observed in the increased life of poles treated by the methods described was also given. The paper contained a summary of information on the practice of treating standing poles which had been obtained through inquiries to a number of operating companies throughout the country. Keen

*These papers appear in this issue of the BULLETIN.

interest was shown in Mr. Packer's paper and many participated in the discussion.

Mr. G. D. Blair, Consumers Power Company, gave an interesting illustrated paper on "Trees and Their Relationship to Overhead Power Lines." Mr. Blair discussed this subject from the standpoint of the need for giving proper care and treatment to trees on highways where it is necessary to build and operate overhead lines. He brought out that many times trees are not properly cared for, nor is due consideration given to them in the planning of overhead lines. Also there are occasions where the wrong kinds of trees have been selected along highways where it is obvious that at some time there will be a need for overhead lines to render the necessary public service. He emphasized the need for coordinative effort in the planning of trees for highways and the building and operating of overhead lines along these routes.

Mr. C. E. Arvidson, Commonwealth & Southern Corporation, presented a paper entitled "A Method of Apportioning Design Voltage Drops for Overhead Residential Distribution Circuits." This was a technical presentation in which the need was pointed out for taking into account the investment and design features necessary to serve overhead distribution loads most economically. The paper was accompanied by considerable illustrative data and charts.

Mr. L. G. Smith presented a report on "Lightning Protection of Distribution Transformers." This is work which Mr. Smith has had in charge for several years and his report at this time was the presentation of data and experience since his last report on this subject.

Mr. F. E. Sanford, Cincinnati Gas & Electric Company, reported on the discussions that had taken place at a session on Oct. 10 on Field Testing of Loads on Distribution Transformers. Mr. Sanford discussed the need for planning the methods for field testing in order to obtain the necessary data for the most economical use of distribution transformers.

The afternoon session for Oct. 12 consisted mainly of reports and a round table discussion on matters of committee interest.

An interesting feature of these meetings of the committees was the dinner meeting on the evening of Oct. 11 at which all members, visitors and guests were invited to attend. Brief talks were given by Mr. W. F. Nimmo of the Virginia Electric & Power Company, who had taken an active interest in the arrangements for this group of meetings, and by Mr. J. G. Holtzclaw, president of the Virginia Electric & Power Company. The main event of the evening was a talk given by Mr. W. F. Davidson on points of interest which he had observed during his trip abroad during the past summer. Mr. Davidson did not discuss matters of technical interest, but confined his talk, which was illustrated by slides, to points of general interest which he had seen and places he had had an opportunity to visit.

The next meeting of the committee is tentatively set for the week of Feb. 6 at Rochester, N. Y.

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# Joint Meeting, Electrical Equipment Committee and Transmission and Distribution Committee

ON Tuesday afternoon, Oct. 11, the Electrical Equipment Committee and the Transmission and Distribution Committee held a joint meeting, with large attendance, where problems of mutual interest were discussed.

The following papers, discussions and reports were given:

Mr. F. B. Crowther of the General Electric Company presented a paper on Street Lighting in which he compared the relative advantages and disadvantages of multiple and series street lighting systems. This paper was preceded by a sound-film entitled "America's Fatal Streets." It illustrated and emphasized the safety angle of street lighting and showed how various methods of street and highway illumination can aid in the reduction in highway traffic accidents. It was brought out that main thoroughfares, representing about 10 per cent of all the street mileage, are the scene of approximately half of the night fatalities, and that although night traffic is but one-third in volume of day traffic, yet 60 per cent of the fatalities occur at night.

Mr. John W. Drummond, Detroit Edison Company, presented a paper entitled "Radio Dispatching of Trouble Crews." This was mostly on the regulations of radio when used by power companies and a description of the way in which the Detroit Edison Company has employed radio dispatching as a means of communication to trouble crews is emergencies. The Detroit Edison Company was one of the first power companies to make such use of radio and the experience gained there has been of interest generally throughout the country.

Mr. S. M. Dean of the Detroit Edison Company presented an interesting paper illustrated by charts and curves on the "Basis of Investment for Increased Reliability — Service Outages." Mr. Dean emphasized the need for keeping careful and accurate records of all outages and their causes together with the time these outages occur. This will enable evaluation of the amount of expenditures justified to prevent service interruptions. Mr. Dean has presented papers on this and similar subjects previously, and these have always been the object of keen interest. Several prepared discussions were read on Mr. Dean's paper, so that numerous angles of this subject were presented.

Reports presented at this meeting were on Utilization Voltages by J. H. Foote of the Commonwealth & Southern Corporation; Principles of Holdoff by H. S. Fitch, West Penn Power Company; Ratings for Registration Statements by H. G. Deardorff of the Dayton Power & Light Company, and Continuing Property Records by R. A. Hentz of the Philadelphia Electric Company. This subject has been under discussion in the committees during the past year and a half and will continue to be of importance on account of the necessity for the engineering departments to become more familiar with portions of accounting systems that are being installed and put into force by utility companies at the request of regulatory authorities. The subject is considered primarily an accounting one, and is being followed closely by the Plant Accounting and Records Committee. Mr. J. V. Cleary, vice-chairman, and Mr. H. P. Taylor, member of the Plant Accounting and Records Committee, participated in the discussion. Mr. H. P. Taylor gave il-

lustrations on how the engineers can assist the accountants in dealing with continuing property records.

At the close of this session those present were favored with an interesting talk by Mr. W. F. Davidson of the Consolidated Edison Company of New York, Inc., which consisted mainly of notes he had taken regarding European Practices on subjects of interest to these two committees. Mr. Davidson had spent considerable time abroad during the past summer and was in a position to discuss the numerous problems with which these two committees are concerned.

# Prime Movers Committee Meeting

**W. E. Caldwell, *Chairman***

THE Fall Meeting of the Prime Movers Committee was held October 3-4 at the Michigan Union, Ann Arbor, Michigan.

The status of relations between the Uniform Boiler Law Society and members of the Committee was discussed and some of the resulting benefits were reviewed. At the invitation of the Committee, Mr. E. C. Wright of the National Tube Company related the manufacturer's problems in the furnishing of carbon-molybdenum piping to the industry. It was indicated that standardization of acceptable sizes would aid in stocking this material and result in mutual benefits to the manufacturer and user. The need for a uniform and less costly system of customer inspection was emphasized and some concern was indicated regarding the recent trend towards specifying special grain size and heat treatment. Professor White explained the apparent need for the consideration of grain size and discussed the effect of steel making practice on the characteristics of the finished product.

Mr. Davidson reviewed foreign developments with special reference to English and German boiler and turbine practice. The European status of flue gas precipitation was also treated, from both the dust and the sulfur standpoint.

Mr. Crocker discussed the ASTM Specification A-193 on bolting for high temperature service and requested the Committee opinion on its general suitability. Mr. Kelting reported that ASTM will soon publish the complete piping material specifications and that members of the Prime Movers Committee will be expected to assist in the disposal of the agreed number of copies.

Mr. Fellows presented information, illustrated by slides, on the progress of the Detroit Edison investigation of metal oxidation under high steam temperatures.

A discussion of governor characteristics as related to operation of combined steam and hydro systems was introduced at the suggestion of Mr. Strowger, Chairman of the Hydraulic Power Committee. The Chairman of the Turbine Subcommittee, who introduced the subject, solicited information on this problem.

At the suggestion of Mr. Elliott, member company practice dealing with short circuit tests of new generators was sought. A letter from Mr. Silver to Mr. Wallau, Chairman of the Electrical Equipment Committee, dealing with this problem was read by the Secretary. In the discussion of the subject a few cases were reported of short circuits in normal operation without damage to the machines.

Monday evening Professor White and his associates in the University of Michigan were hosts to the Committee at a dinner served at the Michigan Union. After dinner a demonstration of sound study work was given by Dr. Firestone, following which were motion pictures and an interesting talk on football by Coach Yost. At the conclusion of the talk the University's spectroscopic laboratory and high temperature material testing laboratory were visited.

On Tuesday morning Professor White presented an illustrated talk on the characteristics of various alloys at elevated temperatures, as revealed by the stress rupture test.

Mr. Searing told of the effect of the recent hurricane and high water which crippled Hell Gate Station, resulting in a major disturbance to the outside system. The method of restoring service was presented, along with an interesting review of the lessons taught by this experience.

The Meeting adjourned Tuesday at noon, after an expression of appreciation to Professor White and his associates for the cordial hospitality and excellent arrangements for the Meeting. Tuesday afternoon the members made an inspection trip to the Delray Station of the Detroit Edison Company.

# An Informal Notebook on Mr. Edison

**EDISON'S OPEN DOOR**

By Alfred O. Tate. 320 pp. New York: E. P. Dutton & Co., Inc. $3.00.

THIS is a readable, informal notebook on the life of Edison during some of his most productive years, as observed by Alfred O. Tate, his secretary during that period. It will enable the reader better to visualize Edison in the light of the man as well as the inventor. Mr. Tate's book is a labor of love, and, while he makes no pretense to a polished literary style, interest is sustained throughout in a thread of anecdote and humor that does not always move smoothly or in chronological order. It is, nonetheless, replete with incidents that would have been of public interest had they been available to the press of the day, while others would have found a well-read place in the gossip notes.

Of much interest are such narratives as that describing how Edison received the news of the merger of Edison General Electric and Thompson Houston companies, which consolidation was to eliminate his name from the great company formed by the merger.

Those who like to probe into the intimacies of the lives of the great will find that Edison had a gift of sleeping anywhere and everywhere and once even slept standing up; and the fall did not waken him! His philosophy of life, his stubborn persistance in a chosen course—all are written in anecdote with a liberal sprinkling of humor which is one of the delightful things about the book. We all like our heroes, as well as their authors, to be human.

Lives of great men must of necessity touch also the lives of others great and near-great. Of special reader interest is the space given to Samuel Insull who, as the time of the setting, was Edison's trusted and capable aide. Tate, who knew him well, takes a firm stand on a controversial subject in behalf of his friend and places Insull's name high on the roster of the development of electric light and power in the United States.

Henry Ford, Herbert Hoover, George Westinghouse, Jay Gould, Buffalo Bill and the Duke of Marlborough, all appear briefly in these pages and all contribute somehow to our understanding of a man who built into the years beyond our knowledge. K. H. S.

# The Advantages of Electric Cookery

(*Continued from page* 443)

be cooked before the owner gets out of bed, but this is only scratching the surface of a potential sales appeal. The control of electricity means the real emancipation of the American housewife. It means the attainment of the full food values. It means more economical cooking. It means better cooking than we have ever known anything about. Push button cooking can be had *only* with electricity.

Now for investment! Most, if not all of the purchases made by the average American are made because he can justify them as investments. He may in his own mind realize that they are investments in pleasure, in leisure time, in labor-saving and other intangibles, or they may be investments which return actual dollars and cents. The most successful products are those which justify themselves as an investment in both the tangibles and the intangibles. Fortunately, electric cooking can be, but seldom is, justified on both grounds. Everyone recognizes that the electric range saves in cleaning time, that it cooks with much less fuss and bother, and that it pays rich dividends in beauty and in acceptable results. But it must be remembered that the electric range also pays a return, when properly used, in dollars and cents.

What has been the cause of the modern trend towards the purchase of cooked foods, towards the growth of the bakery and the delicatessen, towards the tremendous increase in the use of canned foods of all types? The cause is previous labor of cooking, and the desire of the American housewife to have more freedom and more leisure time. With the electric range and its automatic controls she can have her leisure time and also do her own cooking at an astonishing saving. Actual tests show that a dozen biscuits purchased at the corner bakery for twenty cents can be made in the home kitchen at a cost of about ten cents. The cakes which cost sixty cents at the high class bakery shop may be made quickly and easily for a cost of about twenty-five cents in the home kitchen. A few simple calculations will serve to show the average housewife that she can practically pay for her electric range in savings in the foods which she makes in her own home—that is, *if she has an electric range which is fun, not work, to use.*

The greatest of all the advantages of electric cooking is modernity. A member of a competing industry once said publicly that the only sales appeal of the electrical industry is the fact that it is modern!

From the time of the first arc lamp and the first use of electric power the public has believed implicitly that electricity will eventually set the whole world free. People want to be modern and they want the modern things. There is no cooking more modern than electric cooking because it is the last word —cooking without flame. Everything about electric cooking is fine, romantic, enjoyable. That is why the Jones' have electric cooking, and why everybody else is trying to keep up with them. Here again the industry has not fully capitalized on the opportunity to dramatize this thought through a great program of kitchen modernization. The Kitchen Modernizing Bureau is doing a splendid job to bring this point of romance of electricity home to the modern housewife but the industry must go much further. A mental picture of her completely modern kitchen represents the strongest advantage of electric cooking to the modern housewife.

In summarizing, electric cookery has real advantages entirely aside from the time-worn cliches of the past. Electric cooking is not part of the land of make believe, not just a fantasy. Electric cooking is safe as the electric light, healthful as the ultra-violet ray, controllable by the spoken word and an investment as good as the gilt-edged bond. It is the only modern form of cooking simply because it is electrical!

## CONVENTIONS AND MEETINGS

**OCTOBER**

1 Indiana Electric Association, French Lick Springs Hotel, French Lick Springs, Ind.

1 Public Utilities Association of West Virginia, The Greenbrier Hotel, White Sulphur Springs, W. Va.

3-4 Prime Movers Committee, EEI, University of Michigan, Ann Arbor, Mich.

3-6 American Transit Association, The Royal York Hotel, Toronto, Canada.

3-7 National Restaurant Association, Chicago, Ill.

5-9 Electrical Manufacturers Club, The Homestead, Hot Springs, Va.

6-7 Accident Prevention Committee, EEI, Chamberlain Hotel, Old Point Comfort, Va.

10-11 Electrical Equipment Committee, EEI, Chamberlain Hotel, Old Point Comfort, Va.

10-14 American Gas Association, Atlantic City, N. J.

10-14 National Safety Council, Stevens Hotel, Chicago, Ill.

11-12 Transmission and Distribution Committee, EEI, Chamberlain Hotel, Old Point Comfort, Va.

17-20 National Electrical Wholesalers Association, Drake Hotel, Chicago, Ill.

24-25 Wisconsin Utilities Association, Commercial and Technical Divisions of Electric Section, Schroeder Hotel, Milwaukee, Wis.

24-28 National Electrical Manufacturers Association, Palmer House, Chicago, Ill.

**NOVEMBER**

5 General Sales Committee, EEI, Hotel Cleveland, Cleveland, Ohio.

15-18 National Association of Railroad and Utilities Commissioners. New Orleans, La.

**DECEMBER**

12-14 Second Annual Accounting Conference, EEI-AGA, Palmer House, Chicago, Ill.

**JUNE**

5-9 EDISON ELECTRIC INSTITUTE, Waldorf-Astoria Hotel, New York, N. Y.

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